MODERN PLASTICS

JULY 1952

Preferred for improved STRENGTH ... from coast to coast

If you compiled a "Blue Book" of the most successful moldings meeting improved strength requirements, black and brown Durez 1544 would dominate it! For years this rugged pair has opened up fields of application in which no other materials give equal satisfaction.

On borderline jobs where strength specifications may be a little high for general-purpose materials, selection of 1544 repays you and your customer alike. It upgrades your work, and assures him of the performance his product is designed to deliver ... provides the better value that means more profit for you both.

Durez 1544 preforms automatically without the slightest attention and can be run with equal success in any type of mold — compression, transfer or plunger. With a minimum impact strength of 0.34 foot-pounds per inch of notch and minimum tensile strength of 7,000 pounds p. s. i., it combines excellent electrical properties and a smooth, high-gloss surface.

Durez 1544 Black is designed to meet the requirements of Military Specifications MIL-P-14B and MIL-P-10420 (Ordnance). For sample and complete data, write Durez Plastics & Chemicals, Inc., 1207 Walck Road, North Tonawanda, N. Y.

DUREZ

PHENOLIC RESINS

- MOLDING COMPOUNDS
- INDUSTRIAL RESINS
- PROTECTIVE COATING RESINS

Use plastics that give more satisfaction on more jobs

PHENOLIC PLASTICS *that fit the job*

Meet the CHEF MASTER*

—*His Line of Kitchen Allure is Seasoned with* Catalin STYRENE

This bonneted Chef Master could be "French"... again, he might be "Italian"... only one thing's for sure — he comes from good stock — CATALIN STYRENE. His wide-opened arms hold such kitchen-happiness that American housewives just can't resist being embraced. And thus far, nary a husband has been heard to raise an objection; in fact, the homing male, too, is a Chef Master enthusiast!

CATALIN STYRENE is the perfect plastic molding compound for wares, toys and specialties. It gives design a free hand, processes uniformly, is lightweight, strong, colorful, cost-favorable... and truly a Master in its own fields.

* *A Product of Dupol Plastics, Inc., Worcester 5, Mass.*

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CATALIN

In addition to Styrene Molding Compounds, Catalin chemical products include a wide range of Urea, Phenolic, Cresylic, Resorcinol, Melamine and Styrene Resin formulations.

MODERN PLASTICS*

VOLUME 29 JULY 1952 NUMBER 11

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Modern Plastics, published monthly by Breskin Publications, Inc., at Emmett St., Bristol, Conn. Executive and Editorial Office: 575 Madison Ave., New York 22, N. Y. Entered as second class matter at the Post Office at Bristol, Conn., December 14, 1950, under the Act of March 3, 1879.

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Subscription $6.00 a year, $10.00 for two years, $13.00 for three years in the U.S., its possessions, South America, and Canada. All other countries $8.00 a year, $12.00 for two years, $15.00 for three years, payable in U.S. currency. Price of this issue 75 cents per copy in the U.S., its possessions, South America, and Canada; all other countries $1.00. Printed in the U.S.A. by the Hildreth Press, Inc., Bristol, Conn.

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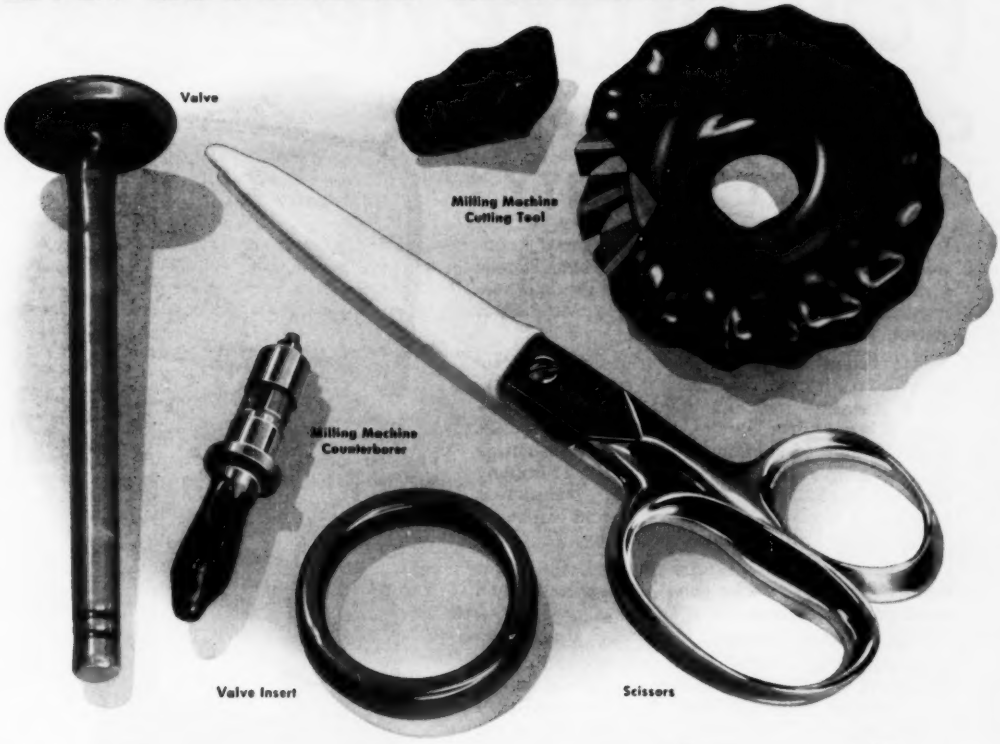
B. F. Goodrich Chemical *raw materials*



DIP AND STRIP "SKIN"

does a great protective job

WHAT do you want protected against chemicals, corrosion, oil and gas, tarnish or scratching? Here is a simple operation that does the job at low cost.

All you do is dip the article in Geon-based plastisols, and your protection is good for a long period. It's also good as protective packaging for overseas shipment.

When the article is ready for use you can strip off the skin in one simple operation. Machine parts, valves, tools, medical instruments, automotive parts and utensils can all be protected by the Geon dip-and-strip skin method.

Plastisols based on Geon paste resin have many uses—and many advantages, too. For they can be made to resist heat and cold, water, weather and abrasion . . . gas, oil and many chemicals. And operations are simpler, because no expensive solvents or recovery systems are needed. There's no fire hazard. Manufacturing costs are reduced. Perhaps one of the versatile Geon materials—resins, latices or compounded plastics—may help you improve or develop more saleable products. For helpful, technical advice, write Dept. GA-7, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. In Canada: Kitchener, Ontario. Cable address: Goodchemco.

GEON RESINS • GOOD-RITE PLASTICIZERS . . . the ideal team to make products easier, better and more saleable.

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON organic colors

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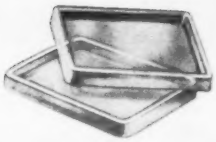
Polystyrene



CAN DO TO IMPROVE PRODUCT QUALITY

If you are planning to use plastics, by all means consider the unusual advantages of polystyrene. Here is a material that has been responsible for improvements in so many products that these pictures can give only a hint of its possibilities.

Polystyrene is rigid and dimensionally stable. Its moisture resistance is excellent; it effectively resists many chemicals including mild acids and alkalis. Since it is not affected by food substances it is most practical for food containers; and its fine insulating properties have made it a favored material for many electrical appliances. It comes in clear, transparent form and a complete range of colors, and can be injection molded rapidly and economically.

Where special qualities are required, the newer styrene copolymers offer good heat resistance and excellent impact strength.

Yes . . . polystyrene offers many advantages. And in practically every application there are substantial savings in cost. But, remember, it takes an experienced molder to get full value from it or any other plastic material. That's why it's important that you entrust the job to someone like Chicago Molded. Here you'll find an organization of plastics specialists with more than 32 years experience . . . men who have handled just about every type of plastics application and molded all the various materials. You'll get a quick and unbiased answer as to whether yours is a practical plastics application, together with sound advice as to its development. And you will have the advantage of the most modern facilities and equipment for fast, economical production.

So . . . why not discuss your plans with a Chicago Molded engineer . . . today? There's no obligation. Just write, wire or phone.

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EDITORIAL

Huge New Markets in the Making

In our Bulletin last month, we reported on expansion plans of plastics materials makers in terms of annual volume of materials that can be available in 1955. Our raw materials capacity should amount to 4,700,000,000 pounds in 1955, as compared with 2,600,000,000 pounds estimated for the present year.

And in the face of decline in sales of refrigerators, radios, television sets, and other products in which plastics are widely used as components, some doubts are bound to arise concerning the likelihood of that much plastics being used.

Refrigerator sales, for example, dropped off from 6,002,000 in 1950 to 4,007,000 in 1951. Television set sales dropped from 7,500,000 in 1950 to 5,100,000 in 1951, and the 1952 picture is no better. Home radio sales fell from 8,174,000 in 1950 to 6,600,000 in 1951.

But consumers bought 251,000 room air conditioners in 1951, as against 195,000 in 1950, and will probably buy close to 400,000 in 1952. And 1,050,000 home freezers were sold in 1951, as compared with 890,000 in 1950, and there's every possibility of the home freezer business reaching 1¼ million units in 1952. The sale of steam irons in 1951 was 2,100,000 units, an increase of 25% from 1950. Here are three magnificent new markets for plastics components. With the opening of new television stations, sales of television sets will again increase; 12,000,000 sets a year by 1955 is a conservative prediction.

In the home construction field, the present pace of 1,000,000 homes a year appears likely to be maintained, and refinements in home construction will rapidly open up new markets for plastics. As an example, there are recent announcements of high-quality prefabs to sell at prices up to $25,000. Such homes are bound to be fitted with decorative laminates, plastics floorings, and other plastics applications.

In 1950 it was predicted that this country would need 400,000 new classrooms by 1960. Approximately 130,000 have already been built. But, because the birth rate has not declined, there's still a need for 400,000 new classrooms. More plastics.

In industrial construction and plant refurnishing, there are even larger markets opening up. The new synthetic fibers are going to force a revolution in textile machinery, for example—opening new avenues of usefulness to plastics. Plastics tooling in the automotive and other fields is still in its infancy.

Of course, the point can't be fully proved by reference to mere numbers of things to be made or built. Each product built is going to contain more plastics parts. The refrigerator and the automotive fields, by 1955, will be much bigger users of plastics than they are today.

To all the uses of plastics in end-product manufacturing must further be added the increase in use of synthetic resins in industrial and agricultural processes. The adaption of phenolic resins to foundry shell casting and the introduction of the polyacrylates into soil conditioning, open new doors for synthetic resins.

In 1952 the plastics industry offers approximately 16.8 pounds of plastics per capita. In 1955, taking into consideration the expected increase in population, we will be able to offer 28.3 pounds of plastics.

Our bet is that this won't be enough.

President and Publisher

CHARLES A. BRESKIN

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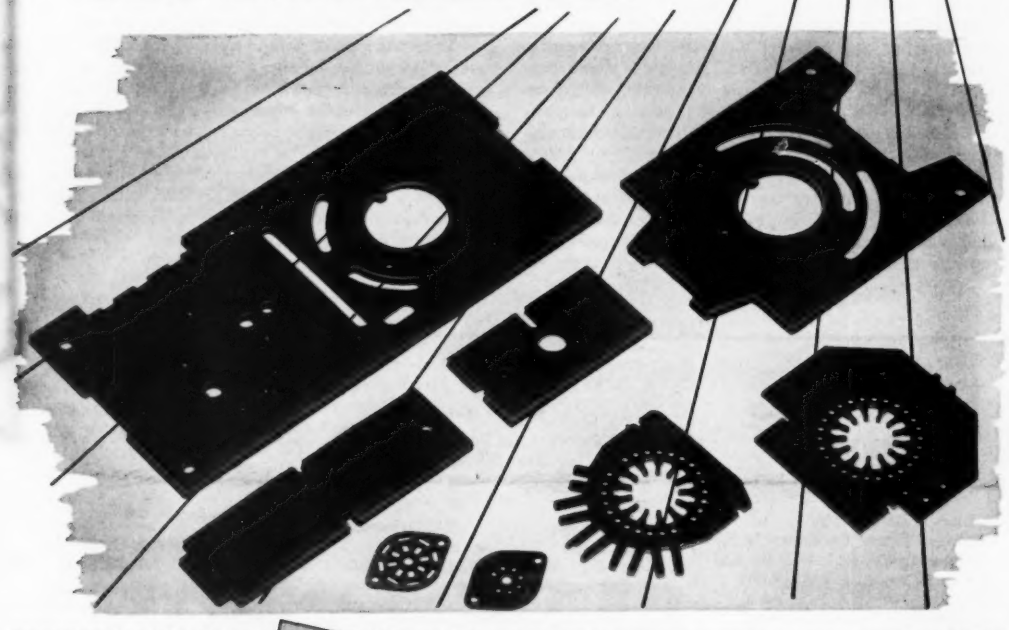
INSUROK T-725 provides RCA Victor with a unique combination of electrical properties. It is used in the R.F. tuners, to maintain insulation resistance under high temperatures and humidities . . . in the I.F. tube sockets, to minimize capacity changes with changes in humidity . . . and in the high-voltage compartment, to provide high dielectric strength and surface resistivity.

For the "tough spots" in your product, write or phone about T-725 and the many other grades of INSUROK laminated insulation.



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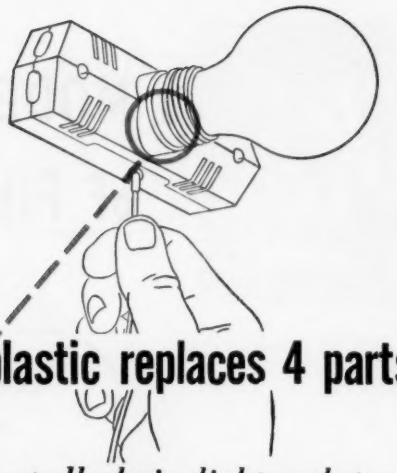
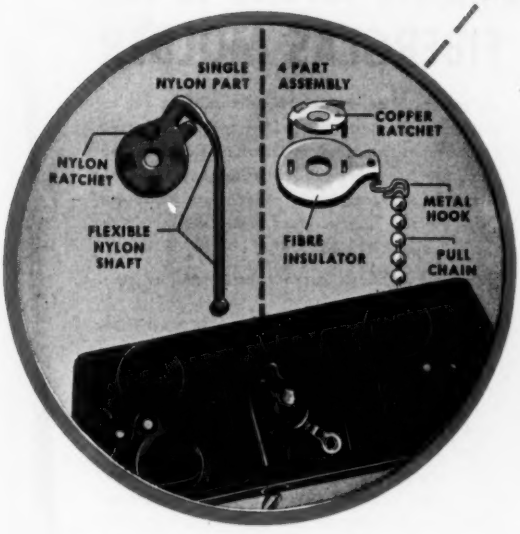


Part molded of Du Pont nylon plastic replaces 4 parts

in pull-chain light socket... cuts manufacturing costs... eliminates possibility of shock



Nylon part molded by the Gries Reproducer Corporation, New York, N. Y., for Monowatt Department, General Electric Company, Providence, Rhode Island.

In the newest pull-chain light sockets manufactured by the Monowatt Dept. of the General Electric Co., four parts—a copper ratchet, a fibre insulator for the ratchet, a short length of chain, and a hook to attach the chain to the insulator—are now replaced by just one part molded of Du Pont nylon plastic. The nylon part reduces manufacturing costs, simplifies assembly . . . and it eliminates *any possibility* of shorting or shocking regardless of dampness or other conditions. UL approved, the part showed no signs of wear after a 12,000-pull test.

This is an excellent example of improved design and better performance made possible by nylon's unique combination of properties. Where nylon replaces the copper ratchet, it has the necessary toughness to resist chipping and cracking. Where nylon replaces the fibre insulator, it has the dielectric properties to take a 250 watt-250 volt load without shorting or shocking . . . yet maintains its strength under high operating temperatures. And where nylon replaces the hook and chain, it has the strength and flexibility in thin sections to take pulling and bending, summer and winter.

Perhaps you can use Du Pont nylon plastic to improve or develop a product. Nylon is available. We'll gladly suggest suppliers of molded parts . . . gladly work with you in developing nylon parts to fit your needs. For further information, write:

E. I. du Pont de Nemours & Co. (Inc.)
Polychemicals Department, District Offices:
350 Fifth Avenue, New York 1, New York
7 S. Dearborn Street, Chicago 3, Illinois
845 E. 60th Street, Los Angeles 1, California

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DEPARTMENT
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Now a MODERATELY PRICED LINE of Fiberglas Molding Presses

Erie Engine also announces a complete service to the FIBERGLAS MOLDER

For the first time, EEMCO is now offering a complete line of moderately priced presses designed for the Fiberglas Molding Industry. Developed in close co-operation with one of America's leading Fiberglas molders, these presses are made for quick delivery in 3 standard platen sizes: (1) 32" x 36"; (2) 42" x 49"; (3) 40" x 76".

Other sizes made to suit customers requirements.

ONE PRESS or a COMPLETE INSTALLATION OF PRESSES WITH OR WITHOUT PUMPS and CONTROLS

If you are now in Fiberglas molding or if you contemplate entering this field, it will pay you to investigate EEMCO's complete service which offers expert and experienced help in the production of one press or a complete unit of presses. EEMCO engineers are glad to help you with their experience which involves all angles in the production of fiberglas molded parts and finished products. Write today, stating your problems. Your inquiry will be given prompt attention.

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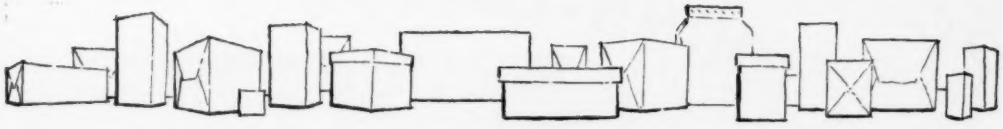
Transparent Packaging Lets a Product Speak For Itself



CONTAINERS AND DISPLAYS MADE OF CELANESE* ACETATE SHEETING DO A HARD-SELLING JOB IN ANY MARKET!

■ Celanese acetate sheeting is giving the extra selling lift that packaged products require in today's "help-yourself" market.

In the fields of packaging and display, manufacturers and merchandisers are sold on acetate's flexibility, ease and economy in fabrication . . . its crystal clarity and lasting sparkle.

Celanese acetate scores better, blanks easier. It can be heat-formed, drawn, blown . . . stitched, cemented, solvent-bonded . . . conveniently sized in cut sheets and continuous lengths . . . thicknesses from .003″ to .250″. . . clear or tinted.

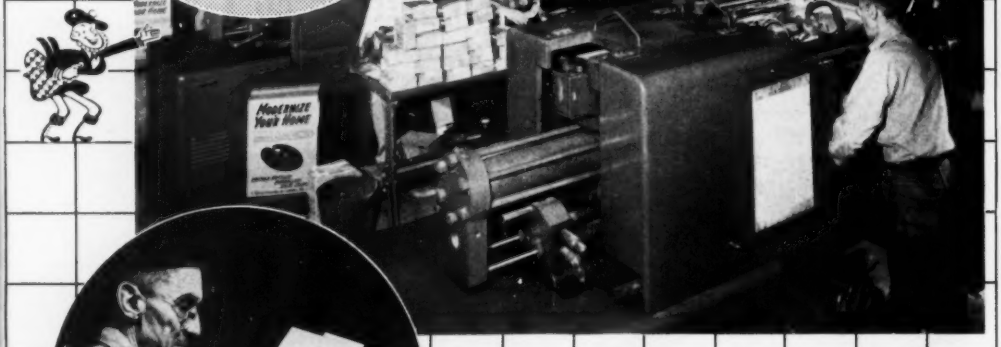
Whether for packaging or other applications, consider acetate sheeting for your product's future. Complete information from your Celanese representative or write to Celanese Corporation of America, Plastics Division, Dept. 101-G, 180 Madison Avenue, New York 16, N.Y. In Canada, Canadian Cellulose Products Limited, Montreal; Toronto.

Celanese* Acetate

*Reg. U.S. Pat. Off.

TRANSPARENT SHEETING

8 oz. "REEDS" MOLD WALL TILE ROUND-THE-CLOCK!



6-cavity wall tile shot removed from 8 oz. "Reed" at Wilson Plastics, Inc.

Battery of 5 Reed-Prentice 10D-8 oz. Injection Machines at Wilson Plastics, Sandusky, Ohio.

At Wilson Plastics in Sandusky, Ohio, Reed-Prentice 10D-8 oz. Injection Molding machines are producing Lockback plastic wall tile in a 6-cavity shot that weighs 179 grams and has a total area of 114 sq. in.

Mr. O. C. Wilson, President of Wilson Plastics, reports, "Our original 8 oz. Reed-Prentice machine, which is nearly six years old, has been in continuous production since it was purchased and a great portion of this time 7 days a week, 24 hours a day."

You, too, can rely on "Reeds" for record production, for less down time and more profits.

SPECIFICATIONS	10D-8 oz.
Die locking pressure, tons	275
Rated casting area, sq. in.	125
Mold opens	10¼"
Maximum die space	16"
Size of die plates	21 x 25"
Weight, lbs.	12,850

THE WORLD'S LARGEST MANUFACTURERS OF INJECTION MOLDING MACHINES

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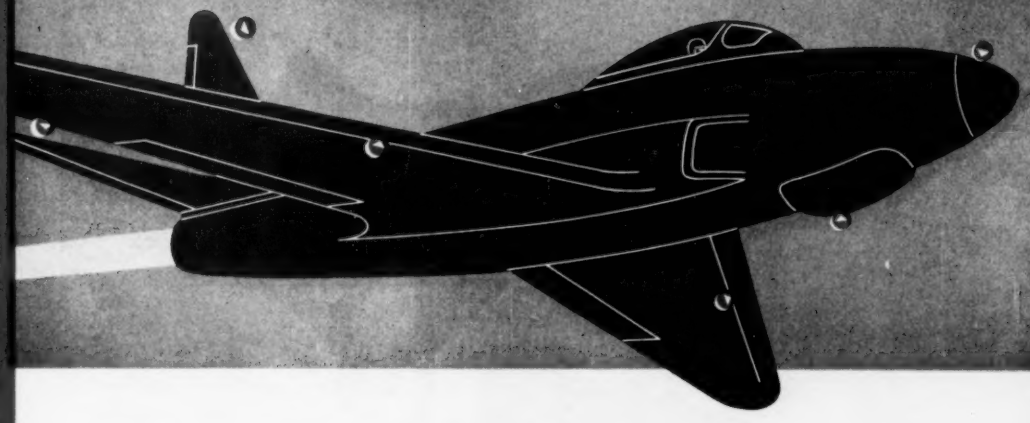
Choice of Leading Manufacturers of Reinforced Plastic Aircraft Parts . . .



PARAPLEX P-43

For high-strength, uniform molded aircraft parts, important producers—such as Zenith Plastics Company and Swedlow Plastics Company—choose PARAPLEX P-43. Swedlow fuel cell backing reinforces self-sealing gas tanks for added safety. Zenith parts protect indispensable radar equipment, provide strong, streamlined leading edges, nose sections, tail assemblies.

Reasons for the choice:—Reinforced plastics based on PARAPLEX P-43 resin show consistently high physical properties; and PARAPLEX P-43 is easy to handle in production schedules.

If you manufacture reinforced plastics for military or civilian use, you'll want to test PARAPLEX P-43. Send for free technical data.

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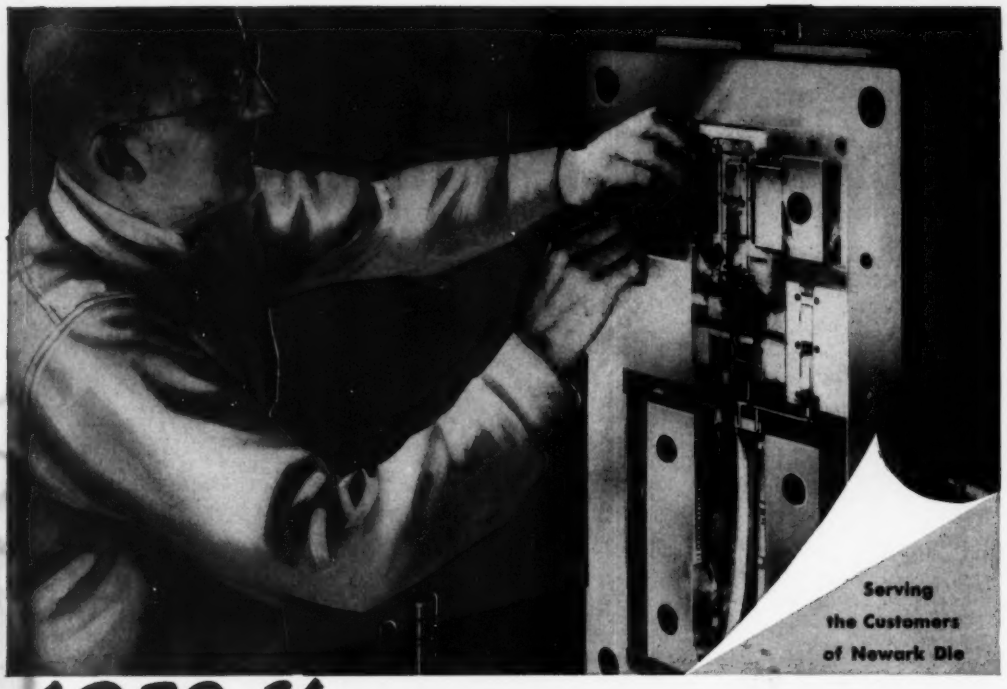

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OVER 50%* OF THE PERSONNEL
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Making the plastic *molds* that produce accurately sized plastic *parts* is a job that calls for the specialized knowledge gained *only* through years of experience.

Here at Newark Die, molds are designed by engineers with many a year of experience—built by seasoned craftsmen operating the most modern machine tools. This men-and-machines combination brings you the precision molds that meet your most exacting requirements!

That's the through-the-years story of Newark Die. Just a few months ago, we enlarged and rearranged our mold-making facilities to permit us to serve our customers more promptly—and to maintain and strengthen our position as leaders in the field of precision molds.

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NDCO TRADE MARK

...yet they all operate MPM extruders

Because they often lack first class service and maintenance facilities, plastic manufacturers in such farflung cities as Lisbon, Athens and Shanghai, to mention a few, must be absolutely certain of the reliability of the machinery they purchase. That is one of the prime reasons why so many of them favor MPM extruders and auxiliary equipment.

The MPM features which impress out-of-country buyers are important to purchasers in the United States, too. MPM's vari-speed drives, for instance, can, without strain, provide ample power to mix components adequately and to extrude extremely heavy cross-sections that are dimensionally true. The screws, cylinders, die heads and other parts of MPM extruders that are normally subject to wear are made of corrosion and abrasion resistant metals in solid sections, rather than platings. Throughout, every MPM extruder is built to serve for years and years.

The places you find MPM extruders in operation are almost as diversified as the range of products being made on them . . . tiny monfilaments to blown film a hundred inches wide, covered electrical wire to irrigation pipe. And the MPM heating system is so flexible that these products are being extruded of just about every known thermoplastic.

What is the conclusion to be drawn from all this? Simply: wherever your plant is located, whatever you want to extrude . . . give full consideration to MPM equipment. It's good business.

California Representative:
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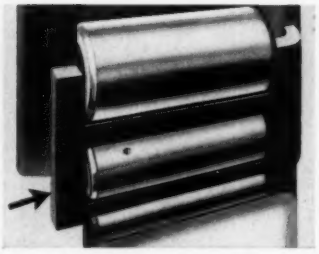
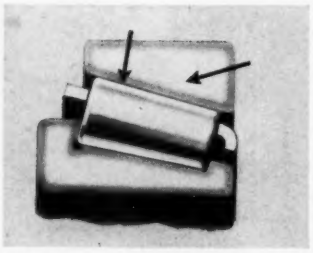
9 good reasons for specifying TIMKEN® tapered roller bearings

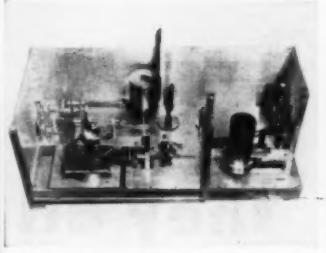
26 TYPES. Because Timken® bearings are made in 26 types, you get exactly the right tapered roller bearing for your job.



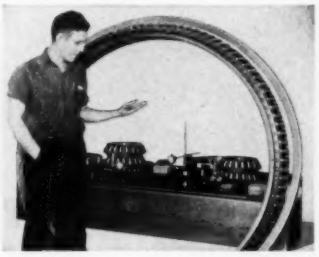
SOFT STEEL CAGE separates the rollers in Timken tapered roller bearings and prevents scuffing.



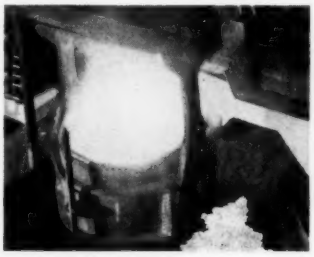
TOUGH INSIDE—HARD OUTSIDE. Case carburizing of rollers and races gives a wear-resistant surface, shock-resistant core.



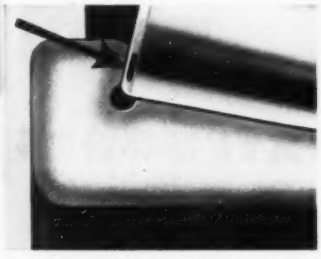
MICRO-INCH FINISH. With help of the profilograph, which measures surface irregularities to a millionth of an inch, the Timken Company has developed a bearing finish of micro-inch accuracy.



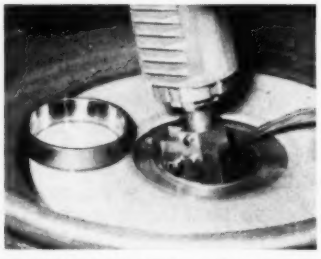
5850 SIZES. If you need a tapered roller bearing smaller around than your finger or as large as 71½" in diameter, you can get it from The Timken Roller Bearing Company.



WE MAKE OUR OWN [illegible] ecause Timken bearings are [illegible] special alloy steel, produced in [illegible] Timken Company's own mills, they have extra strength and wear resistance.



RIB OF CONE maintains roller alignment, prevents skewing, assures maximum bearing capacity.



PRECISION MANUFACTURE makes possible bearings with a maximum runout tolerance of less than 75 millionths of an inch.

GENEROUS RADIUS on the inside diameter of Timken bearing cones permits greater shaft strength.

No other tapered roller bearing gives you all the advantages you get with Timken bearings. Be sure every tapered roller bearing you use carries the name "Timken", the trade-mark of The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST →◫← LOADS OR ANY COMBINATION ✳

W-S PREPLASTICIZERS

mold more... FASTER

with present equipment.

Yes, the fastest way to increase the productive capacity of your plant, is to install on your present injection molding machines – Watson-Stillman PREPLASTICIZERS.

Years away from the experimental stage, W-S modern PREPLASTICIZING Units are designed and built to mount right into position on present machines, and when installed, they give you the following advantages in your molding operations:

1. *Shorter Molding Cycles* . . . In many cases cycles can be cut one-third to one-half.
2. *Piece weight savings* in a great number of cases can be *immediately* realized.
3. *Better Moldings* . . . Because the material in the shooting cylinder is completely plasticized at the start of the injection stroke, injection pressures in most cases can be reduced fifty percent or more, resulting in strain-free moldings and less rejections.
4. *Thinner Sections possible* . . . Wherever warranted, thinner sections are obtainable by means of using maximum injection pressure on the plasticized material without the pressure restriction caused by the torpedo.

And . . . don't forget, WATSON-STILLMAN has been building PREPLASTICIZERS for years and offers a complete line of these units for all E–Series injection molding machines. Let us tell you more about them. Write today.

W-S HYDRAULIC

9-M-31

HYDRAULIC MACHINERY DIVISION

ROSELLE, NEW JERSEY

WATSON-STILLMAN

ESTABLISHED 1848

W-S "COMPLETELINE"—SHORTEST DISTANCE FROM PRODUCTION TO PROFIT

Material Manufacturers—Plastic Compounders—Molders

GET THESE 8 COMBINED ADVANTAGES IN REDS AND YELLOWS FOR COLORING YOUR PLASTIC MATERIAL

REDS and YELLOWS

CADMOLITH

Glidden leadership in pigment research offers material manufacturers, compounders of new or old materials, plastic molders, or coaters a combination of advantages found in no other Red or Yellow pigments. These colorants, in Glidden CADMOLITH* Colors make your coloring job easier—give finest, most lasting colors in powders or plastic products made from them.

Specify Glidden CADMOLITH* Gain these 8 Superior Properties . . .

- Soft, and Easy to Grind
- Alkali and Acid-Resistant
- Non-Fading to Light
- Wide Range of Shades
- Insoluble in all Vehicles
- High Heat Resistance
- Non-Bleeding
- Opaque

SEND FOR THIS FOLDER giving complete details, with color chips. Write The Glidden Company, Chemical & Pigment Company Division, Union Commerce Building, Cleveland 14, Ohio.

*Trade Mark Registered

QUALITY Glidden PRODUCTS

SUNOLITH* Lithopone

ZOPAQUE* Titanium Dioxide

TITANOLITH* Titanated Lithopone

Look for a 1-Track Mind...

For Results in Thermosetting Moulded Plastics

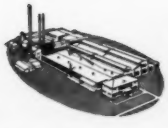
Your thermosetting jobs are set for a clear right-of-way here at Kurz-Kasch. Compression, transfer and plunger moulding methods are what we are set up for expressly—both physically and mentally. Idea, of course, is to deliver all the advantages of specialization and experience.

You want a moulder strong on tool control and production, too—and that's the second strong part of our system. Matter of fact, we've just finished adding more mould-making capacity to one of the finest toolrooms in the business.

If you have a thermosetting job (any of 'em including Teflon or moulded glass-filled polyesters) that track's pretty clear right now. If, on appraisal, the job you submit can be more effectively handled by other moulding methods, we'll be happy to recommend fellow-specialists in the proper fields. Call us—or one of our offices.

Kurz-Kasch

FOR OVER 38 YEARS PLANNERS AND MOULDERS IN PLASTICS



Kurz-Kasch, Incorporated • 1415 South Broadway • Dayton 1, Ohio

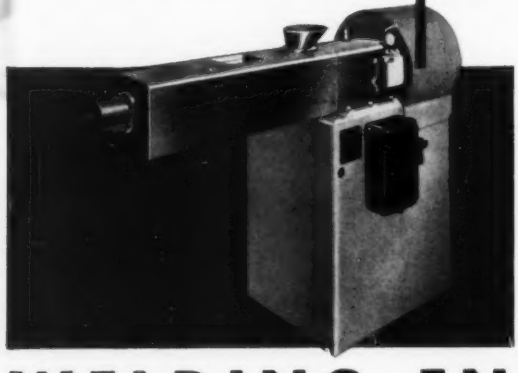
BRANCH SALES OFFICES: New York, *Lexington 2-6677* • Rochester, *Hillside 4352* • Chicago, *Harrison 7-5473* • Detroit, *Trinity 3-7050* • Philadelphia, *Granite 2-7484* • Dallas, *Logan 1970* • Los Angeles, *Richmond 7-5384* • St. Louis, *Delmar 9577* • Toronto, *Riverdale 3511* • **EXPORT OFFICE:** 89 Broad Street, New York City, *Bowling Green 9-7751.*

GET INTO THE FAST GROWING MARKET FOR

RIGID VINYL PIPE

YOU CAN PRODUCE IT IN TOP QUALITY WITH *NO* SPECIALIZED EXPERIENCE! WELDING ENGINEERS DUAL WORM EXTRUDER #2040 WILL DO IT FOR YOU

Get the Facts on the Machine with our "Know-How"



The most demanding production experience with Welding Engineers' No. 2040 extruder shows no trace of decomposition in worms or liners in continuous operations. The exclusive dual worm design provides controlled temperatures along the entire barrel, compensating for any heat sensitivity of the vinyl feed. We will be pleased to show you the merits of Rigid Vinyl Pipe production the Welding Engineers way: low operating cost, small floor-space requirements, one-man operation, modest equipment investment... it's worth knowing *all* about. *WRITE:*

MACHINERY DIVISION

WELDING ENGINEERS, INC.

NORRISTOWN, PENNSYLVANIA

MANUFACTURER OF IMPROVED MACHINERY FOR THE PLASTICS, CHEMICAL AND PETROLEUM INDUSTRIES


KLEESTRON
POLYSTYRENE MOULDING POWDERS
THE VERSATILE PLASTIC
No need to state the virtues of polystyrene. It is accepted all over the world for its versatility . . . its adaptability. At long last the designer has been given a moulding powder reasonably free from limitations.
No need either to state the virtues of Kleestron. Enough to say it is made by Kleemann's in their new factory at Welwyn Garden City and is being sold . . . and moulded . . . and praised all over the world.
O.& M. KLEEMANN LTD.
Address all enquiries to :
O. & M. KLEEMANN LIMITED
West Halkin House, West Halkin Street, London, S.W.1., England

We Were Wrong!

In a recent advertisement of ours, we pointed out that vacuum equipment manufacturers were claiming three to five cycles per hour with their latest-type pumps . . . while we, before installing these latest-type pumps, actually experienced only one load per hour.

Since our latest advertisement, we have installed these new pumps on one of our units. These new pumps are amazingly wonderful. They're delivering three cycles per hour!

***But,* that's as unimportant as though your auto dealer sold you a car to do 500 miles per hour!**

You normally can't drive 500 miles an hour

and

You normally can't use the production of one cycle an hour . . . let alone three.

BECAUSE:

You can't sell the output of one machine running only one load per hour.

We've been in vacuum metalizing of plastics from the very beginning. And, being one of the pioneers and leaders in the field, we have the good fortune to serve 8 out of 10 of America's largest users of metalized plastics. We know from experience, that no one manufacturer can sell the output of one machine doing only one load per hour, or 400 loads per month . . . and it's in the realm of impossibility to sell the production of 1200 cycles per month which is the potential number of cycles with latest-type pumps.

We've seen the volume required for "Hot Numbers." Let's analyze, for example, the sales of this season's hottest metalized plastic number . . . Silver-Rich's Space Cap . . . seven metalized parts on a felt beany retailing at 59c. This item is being re-ordered in lots of as much as 120 dozen per syndicate store. This item is actually classified Red Hot!

We metalize 12,800 Silver-Rich parts per cycle. This *Red Hot* item uses one-fourth (¼) of one machine's capacity . . . figuring only 1 cycle per hour, not 3.

Do you, Mr. Manufacturer, figure that you can have 4 such red-hot numbers running throughout the year? If you can, and if you have your own vacuum operation, you will be running 400 loads a month at a cost of $35.00 per load. It is an accepted fact that the minimum monthly base cost of a vacuum operation is $14,000.00 . . . at 400 loads per month the minimum load cost is $35.00, to say nothing of your investment of $50,000.00 to $100,000.00 for a complete vacuum installation.

Whether or not you are a large or small user of metalized plastics, we at Vacuum Metalizing Corporation guarantee to produce better quality plastic metalizing at less cost than in your own plant.

VACUUM METALIZING
C O R P O R A T I O N

Long Island City
New York

BETTER QUALITY PLASTIC METALIZING AT LESS COST THAN IN YOUR OWN PLANT.

Production Reaches New Heights on H-P-Ms at G.A.T.X.*

Jet pilots are "sitting pretty" . . . from the standpoint of safety . . . on jump seats molded of reinforced plastics on H-P-M presses at G.A.T.X. . . . seats that are "shot" out of the plane if a pilot must bail out at high speeds.

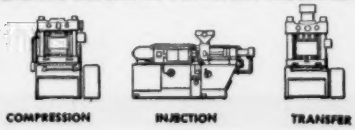
This is just another of multitudes of new markets opening up for the molder who is equipped to mold reinforced plastics on a production basis.

H-P-M offers a complete stock line of presses for molding reinforced plastics . . . self-contained presses with semi-automatic control, fast closing, automatic slow-downs and accurate control of pressure. Get complete details and specifications—write for Bulletin 5107 today!

* *General American Transportation is the home of many H-P-M plastics molding machines. The 200-ton H-P-M press shown here is molding reinforced plastic safety seats for "jets." Double molds permit two seats to be molded at one time.*

HPM

PLASTICS MACHINES FOR EVERY MOLDING JOB

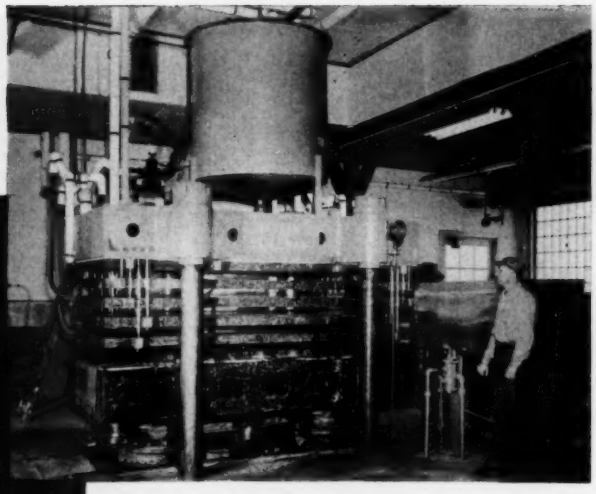


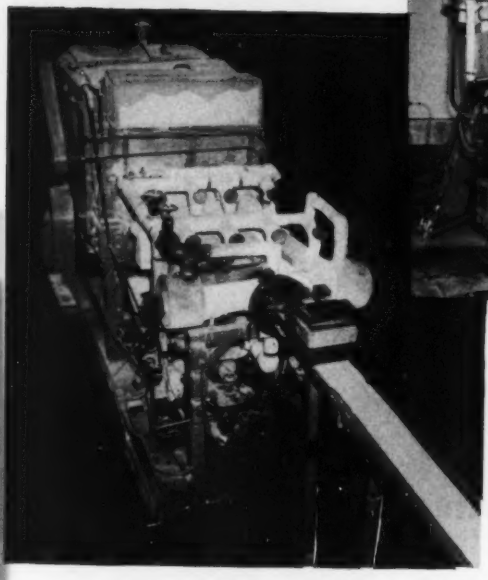
COMPRESSION INJECTION TRANSFER

THE HYDRAULIC PRESS MFG. CO.

1010 MARION RD., MOUNT GILEAD, OHIO, U.S.A.

IT TAKES THESE 2 MACHINES





TO MAKE 1 SANDWICH (but what a sandwich!)

Not edible but mighty practical because the core is lighter than balsa wood while the skins are lighter than aluminum but on a weight basis, as strong as steel. The extruder at the left produces the core of STRUX* (CCA).

This expanded plastic (cellular cellulose acetate), manufactured under duPont license possesses great structural strength and provides extreme rigidity and resistance to fatigue. Relatively unaffected by extremely low temperatures, STRUX does not tend to become brittle or frangible and will withstand temperatures up to 350° F. for long periods.

REPCO, the reinforced laminate, is produced on the 700 ton press at the right in panels as large as 4 x 9 feet . . . in any thickness up to ½" . . . as many as 15 panels at a time . . . in an unlimited range of colors. Bonded together, usually with polyester or epoxy resins, STRUX and REPCO form an unbeatable sandwich for interior use in planes, trains, boats, trucks and refrigerators . . . for foot lockers, luggage, shipping containers, furniture and hundreds of other uses.

STRUX, extruded continuously in boards, rods or special shapes in a variety of sizes, is by no means limited to sandwich construction. Composed of non-intercommunicating cells, it is an excellent thermal, electrical and sound insulator, has unusual buoyancy in water, oil and other liquids, resists fungi and decay and can be used with almost any commercial adhesive. Consequently STRUX has excellent applications as buoys, floats, for X-ray and electronic equipment and similar products.

*T.M. Reg.

Write today for samples and descriptive literature

STRUX CCA

STRUX CORPORATION

47 WEST JOHN STREET, HICKSVILLE, LONG ISLAND, NEW YORK

Associated Companies

RUSSELL REINFORCED PLASTICS CORP., Lindenhurst, L.I., N.Y.

AIRCRAFT SPECIALTIES CO., INC., Hicksville, L.I., N.Y.

Manufacturers of phenolic thermosetting molding compounds and phenolic synthetic resins for the electrical, transportation, home appliance, paper and pulp, protective coating and foundry industries.

Dry granular phenolic thermosetting molding compounds are produced in blacks, browns, mottles and colors in general purpose, heat-resisting and medium impact grades. Special purpose molding compounds are produced to fulfill special molding requirements.

Synthetic resins are produced in dry, lump and finely ground particle size or in solution adaptable to customer's requirements. Technical service is extended and inquiries are invited.

PLASTICS ENGINEERING COMPANY

Sheboygan, Wisconsin

Tupper Seal, air and liquid tight flexible covers fit, and are included in the sets of all Tupperware Canisters.

The Tupperware 50 oz. Canister is "standard equipped" with the Tupper Seal, air and liquid-tight flexible Pour All cover.

The Tupper Seal, air and liquid-tight flexible Pour All cover is used on every Tupperware 20 oz. Canister.

The Tupper Seal, air and liquid-tight, Pour All cover as a cover for 46 oz. cans; Tupperware Sauce Dishes and other containers of metal, glass or pottery. Foods easily dispensed without removing entire cover.

The Tupperware Wonder Bowls are usually fitted with Tupper Seal, air and liquid-tight covers.

Argentine Patent 74,095 dated Dec. 14th, 1949 on invention covered by U. S. Patent 2,487,400 November 8, 1949. Canada Patent 463,387 Feb. 28th, 1950, Union of So. Africa Pat. 8,592 Sept. 21st, 1949. Belgium Pat. 491,293 Oct. 15th, 1949. Switzerland Patent 48,970 Sept. 23rd, 1949. Italy Patent 456,937 September 19th, 1949. Other U. S. and Foreign Patents Pending.

TUPPER / Seals

air and liquid-tight, flexible covers for Tupperware Tumblers, Canisters, Wonder Bowls, Cereal Bowls and many another container of glass, metal and pottery, the contents of which it is desired to keep fresh and wholesome.

TUPPER /

FORMAL NOTICE! 9th November, 1949

EXCLUSIVE!

U. S. Patent #2,487,400

The Tupper Corporation has attained a position of leadership in this industry by incurring great expense and expending painstaking effort in the development, design, manufacture and exploitation of its many world-known products.

The Tupper Corporation further has anticipated the inevitable attacks to which leadership is subject and has taken measures provided by law to preserve the creative rights to its products, methods and design by patent protection both in the United States and abroad.

Tupper Seals for Tupperware shown in this advertisement are just a few of the forms covered in this manner and are specifically covered by U.S. Patent #2,487,400.

Only the Tupper Corporation, by U.S.Patent #2,487,400 has the right to make, use and vend container closures in connection with any and all types of containers throughout the United States and its territories as covered by the claims of the Patent.

Tupper Corporation will protect, according to law, the exclusive rights above granted

TUPPER CORPORATION

There's a Tupper Seal, air and liquid-tight flexible cover for Tupperware 2, 5, 8 and 12½ oz. Tumblers too, and these Tupper Seal, covers fit many other containers of metal, glass and crockery.

The Tupper Seal, air and liquid-tight flexible Por Top cover, specially designed as a dispensing cover for specified diameters of containers holding foods such as syrups, salad dressings, catsup.

The cover of the Tupperware Bread Server which serves as a bread tray also is designed to give similar results as Tupper Seal, air and liquid-tight Flexible covers. Keeps contents fresh as no other such container.

When equipped with Tupper Seal, air and liquid-tight, flexible covers, Tupperware Cereal Bowls serve many another purpose.

The Tupper Seal, air and liquid-tight flexible cover made for Tupperware 8 oz. Tumblers also fits and is sold with all Tupperware Funnels as a base when funnels are used as storage containers.

TUPPER CORPORATION

Manufacturers of — CONSUMER, INDUSTRIAL, PACKAGING AND SCIENTIFIC PRODUCTS

FACTORIES: Farnumsville, Mass., and Cuero, Texas **New York Show Rooms 225 Fifth Ave.**

ADDRESS ALL COMMUNICATIONS TO: Department M-7

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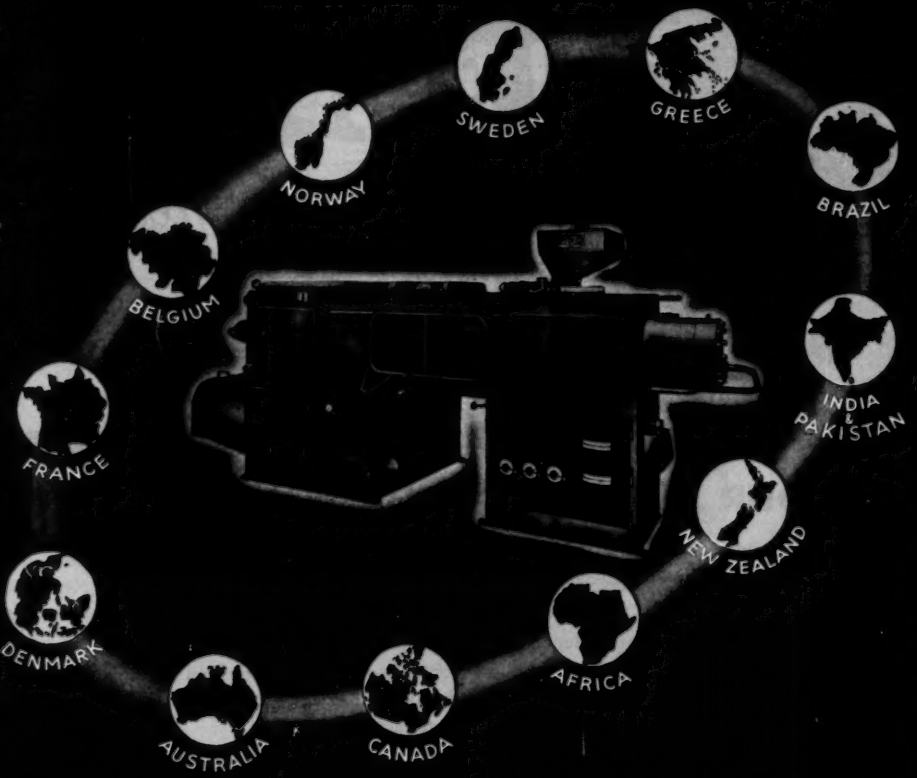
MOULDING

THROUGHOUT THE WORLD



INJECTION MOULDING MACHINES

PECO MOULDS. Expert Designers and mould makers are employed and moulds can be supplied to samples submitted, including die-sinking models if desired. An important side of the Company's work is the hobbing of cavities for moulds and medallions — the plant includes a 3,000-ton Hobbing plant. Master hobs for customers' samples made as required.

Full particulars of our range of Injection Moulding Machines and Moulds will be sent on request.

PECO PRODUCTS

THE PROJECTILE & ENGINEERING CO. LTD.

ACRE STREET, BATTERSEA, LONDON, S.W.8, ENGLAND

Telephone: Macaulay 1212 · Telegrams: "Profectus, Clapham, London" · Cables:

ASK "CUBEE" FOR THE ANSWER

TO YOUR PLASTICS PROBLEM

Manufacturers in nearly every industry have done just that—profitably. We have all the facilities necessary to the solution of your plastics problem right here under one roof . . . one control, one responsibility.

Every step in the production of your part—from initial design to final inspection and packaging—is under the watchful eye of our experienced craftsmen. We have produced parts for many fields such as: aviation, automotive, electrical appliances, business machines and production equipment.

We know that our experience can be helpful to you. The next time you are faced with a problem involving plastics, Ask Cubee for the Answers.

QUINN-BERRY CORP.
2651 West 12th Street
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BUY PLIOVIC

and depend on these trained men

FROM your initial order of PLIOVIC vinyl resin – through immediate shipment from a conveniently located plant or warehouse – all the way to the marketing of the end product you make, you can depend on these Goodyear field men for complete service.

In the development and manufacture of your product you can rely on the technical knowledge and use-proved practical experience of these trained men, backed by a complete technical service organization.

In today's competitive market, you'll find their ready, willing and able assistance is invaluable. So call your nearest representative today.

USE PROVED *Products*

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Pliovic—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

GOODYEAR

The chemists really started something!

To chemists goes the credit for the discovery of plastics. And through their vision and imagination, chemists are largely responsible for taking plastics out of the test tube and helping create one of our fastest growing industries.

Chemists also first found that titanium pigments were the best white colorants for plastics. Today, molded or extruded articles are produced in gleaming whites, soft pastels, rich tints, with the aid of Titanox — the first titanium pigments. In sheeting, these pigments are used to attain complete opacity or any desired degree of translucency.

Time and again Titanox pigments have proved their ability to add the beauty which makes plastic products so attractive. New production facilities are assuring a constant supply. Our Technical Service Department will help you anytime in the use of Titanox pigments. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

® TITANOX

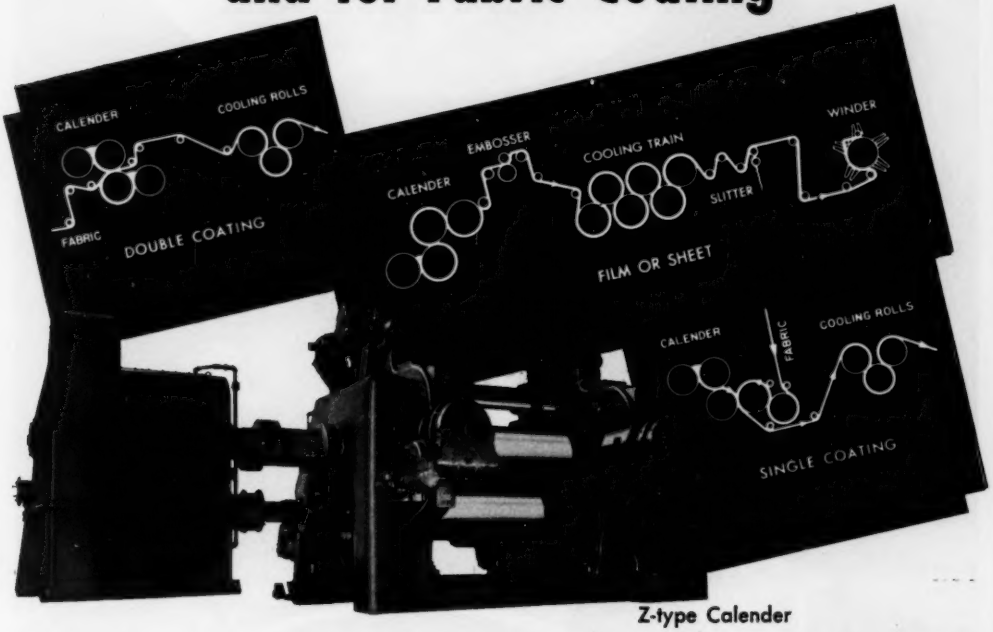
the brightest name in pigments

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

EXPERIENCE COUNTS IN CALENDER DESIGN

For High-Speed Production of Film and for Fabric Coating



Z-type Calender

Farrel-Birmingham is generally recognized as the world's leader in the design and manufacture of calender trains for high-speed production of film and for fabric coating. In the last few years, the company has built more than one hundred plastics calenders and the latest Z-type design has been specially developed for this exacting work.

Here is what this vast experience means to you:

ACCURACY and VERSATILITY — The Z-type calender can produce unsupported vinyl film to gauge as light as 1.7 on a commercial scale, with linear gauge held within .0001". Transverse gauge, also, can be accurately controlled throughout a wide range by means of a motor-operated device for crossing the roll axes. The performance records of one installation indicate that accurate gauge material is produced over a range of .004" to .020" by utilizing this means of adjusting roll "crown."

SPEED—Farrel-Birmingham calenders are designed for maximum production speeds greater than chemical limitations, at present, permit.

ENGINEERED LAYOUTS—The company has specialized in engineering calender trains, incorporating an embosser directly off the calender, cooling train and windup (see diagrams). Other units, such as Banbury mixers and mills, matched in capacity with the calender train, can also be supplied to make production a single, integrated operation.

Farrel-Birmingham engineers will be glad to discuss your calendering requirements with you at any time. Why not call them in for consultation today?

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT
Plants: Ansonia and Derby, Conn., Buffalo, N.Y.
Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Los Angeles, Houston

FB-754A

Farrel-Birmingham®

two simple moves...

. . . . . the result of much planning and forethought, enable the chessmaster to achieve success. Much planning and forethought has resulted in the production of the FRANCIS SHAW Hand-operated Injection Moulding Machine. As pioneers of injection moulding machines in England—we built the original in 1931—our forethought has produced a machine which, with two simple movements of the hand lever, moulds cleanly, crisply and quickly such articles as these chessmen.

Designed for moulding thermoplastic materials such as Cellulose Acetate, Polystyrene, Polyvinyl Chloride etc., it has a capacity of ⅛ oz. at 1 shot per minute or ⅛ oz. at 3 shots per minute, with a current consumption of only ½ K.W. per hour. Send for leaflet P303/1 for full details.

These chessmen were moulded on this machine from moulds manufactured and engraved by the Lumb Hall Engineering Co., Bacup, Lancs.

hand operated injection

MOULDING MACHINE

SHAW

FRANCIS SHAW AND CO LIMITED MANCHESTER 11

Industry's Headquarters for the best in plastic machinery

STYRENE MONOMER

increased supplies

private industry

Get this new book

Treating styrene monomer as the starting point for large-volume chemical manufacturing, this new book discusses manufacturing and application possibilities of Styrene Butadiene Emulsions, Styrene Polyester Resins, Elastomers, Styrene Modified Alkyd Resins, Styrenated Oils, Ion Exchange Resins, Adhesives and Bonding Agents . . . Under each of these major headings is included a discussion of end products which are being developed in constantly increasing number.

Now, with *doubled capacity* for producing styrene monomer in its enlarged Texas City plant, Monsanto becomes one of the country's leading sources of this reactive raw material.

To private industry, this is welcome news. It means a greatly increased supply of monomer—made to rigid Monsanto standards—for the production of resins and copolymers . . . Available in tank-car and 55-gallon drum lots . . . MONSANTO CHEMICAL COMPANY, Texas Division, Texas City, Texas.

MONSANTO
CHEMICALS — PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

MONSANTO CHEMICAL COMPANY,
Texas Division, Texas City, Texas.

Please send copy of "BUILD Bigger Business with BETTER PRODUCTS made from STYRENE MONOMER" to—

Name..... *Title*.....

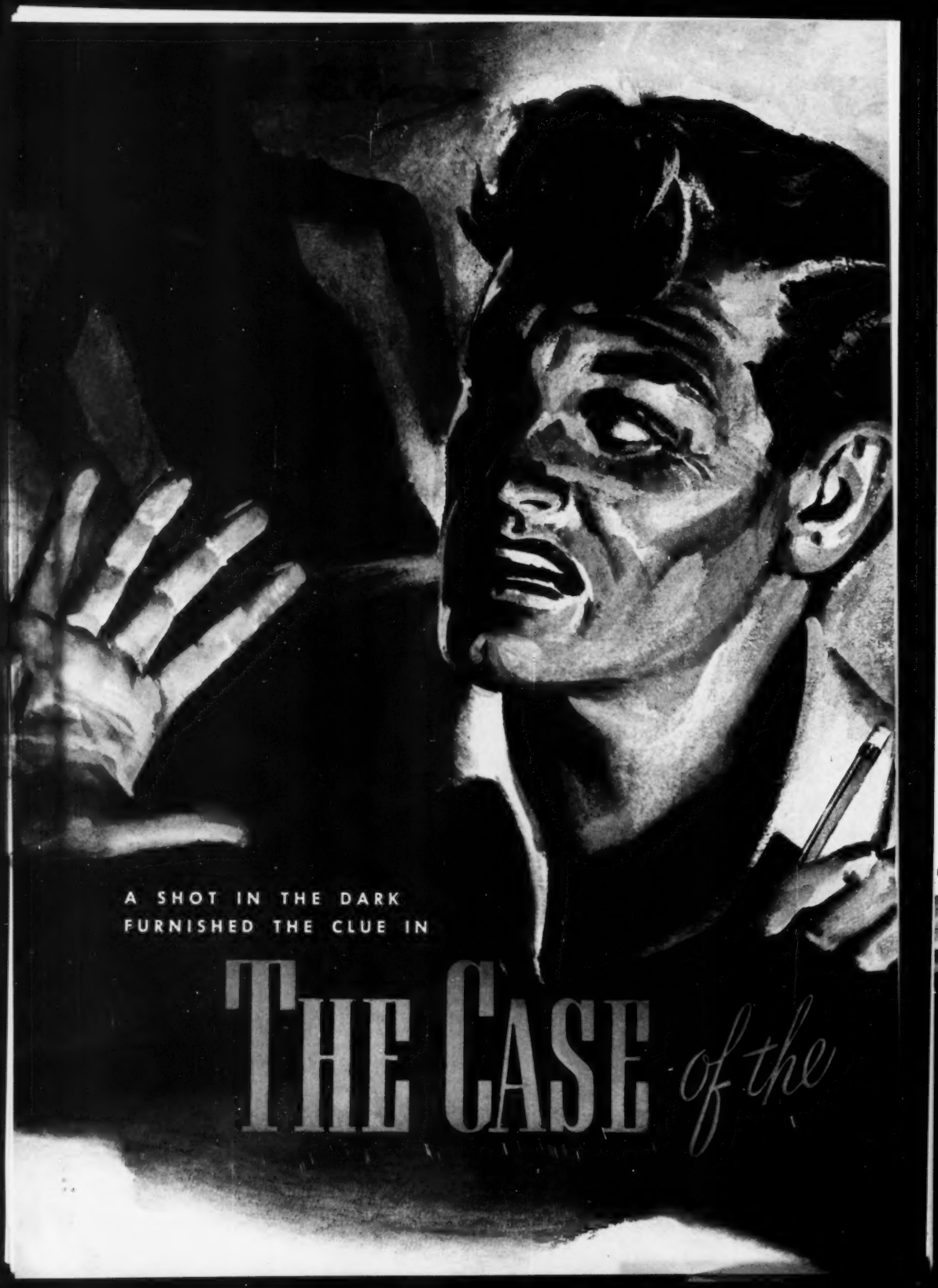
Company.....

Street Address.....

City..... *Zone*..... *State*.....

We use styrene monomer, or derivatives, for

.....


A SHOT IN THE DARK
FURNISHED THE CLUE IN
THE CASE of the

WALKING MAN

a true story by Ellery Queen

Illustrated by RICO TOMASO

CLOUDS covered the moon, the wind was rising. In the drafting room, the single shaded light over the drawing board had begun to sway, gently at first, then faster. Shadows swelled and shrank on the wall behind the engineer.

Since closing time, he'd sat alone in the Pyro engineering office, pouring over specifications, searching his brain for a way to design and manufacture a new wind-up *activated* plastic premium of the famous "peanut man" trade mark. But Planters Mister Peanut was stubbornly refusing to be activated.

The model of the "little man" stood, mocking and defiant, on the edge of the table, his monicle impeccable, his smile fixed.

As the engineer stared, the tail of his eye caught the movement of a shadow. Wheeling round, he was startled by the giant image of Planters Mr. Peanut dancing across the wall to the swing of the lamp. From wall to ceiling and back again the shadow moved, his body seeming to bend and straighten at the waist, as though he were walking. *Walking!* That was it!

The engineer jumped to his feet. Now he had the answer. By activating the molded torso so that it moved rapidly from side to side, enough momentum would be created to propel Mr. Peanut—his arms swinging—forward across a flat surface.

That *sounded* simple enough. But before the end-product finally appeared, Planters Mr. Peanut had engaged the experience, ingenuity and know-how of 360 Pyro technicians. New special equipment had to be designed; and because of the activating mechanism, new techniques of assembly had to be developed. At the same time, the product had to meet Pyro's exacting standards of quality, speedily delivered, at competitive prices.

All of this was successfully accomplished before Pyro closed the Case of The WALKING MAN.

☆ ☆ ☆

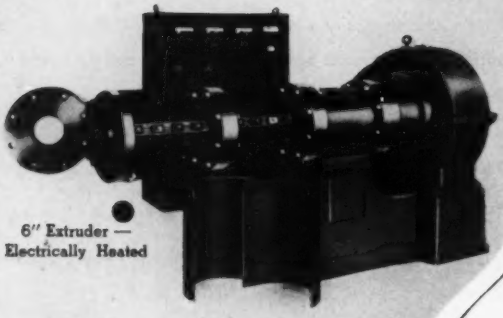
Your company, your products, too, can benefit by taking advantage of Pyro's extensive facilities, all under one roof: consultation, product creation and design, engineering, molding, research and development. When your production plans call for injection molded plastics, call in Pyro's engineers. Estimates submitted promptly upon receipt of your specifications.

STARTING POINT FOR A BETTER PRODUCT

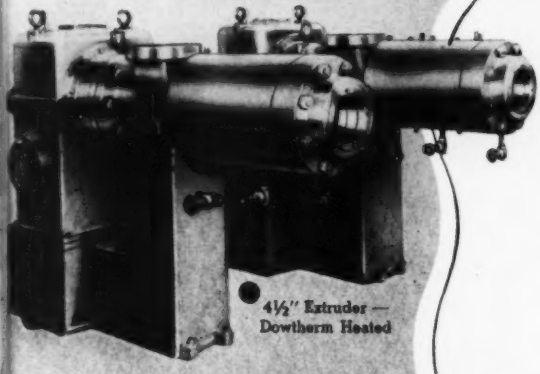
Pyro Plastics Corporation
Pyro Park, Union, New Jersey

Mr. Peanut is the registered trademark of Planters Nut and Chocolate Co.

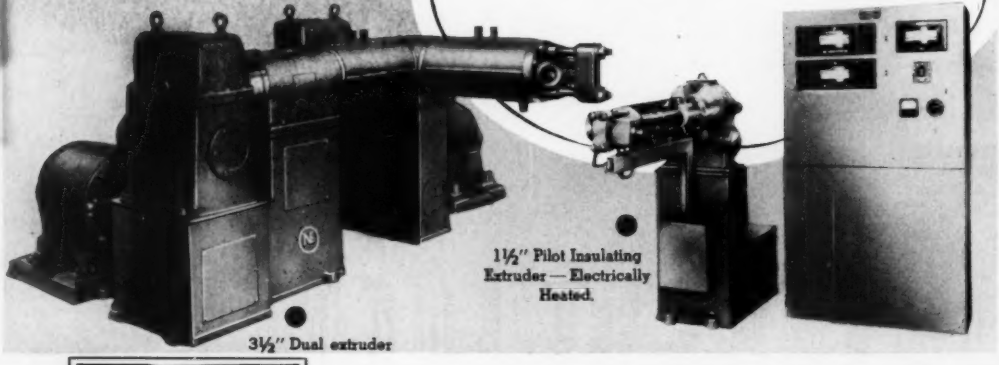
Send your EXTRUSION problem to NE engineers



6" Extruder — Electrically Heated



4½" Extruder — Dowtherm Heated



1½" Pilot Insulating Extruder — Electrically Heated.

3½" Dual extruder

THE WELL-KNOWN LINE of National Erie equipment is now manufactured by Aetna-Standard and sold by Hale & Kullgren, Inc. These firms can furnish replacement parts for all existing National Erie equipment.

Whatever you need in the way of extrusion equipment, call on Hale & Kullgren. They have a long-standing reputation for sound work in rubber and plastics machinery. Their engineering organization includes the entire, former National Erie engineering staff.

These experienced engineers are backed up by the large manufacturing plants of The Aetna-Standard Engineering Company.

The combined experience of these companies covers the full range of extruders from smallest laboratory units to largest production sizes, including all proven methods of cylinder heat control by electricity, oil, steam or Dowtherm. For prompt and efficient quotation, send your inquiry to:

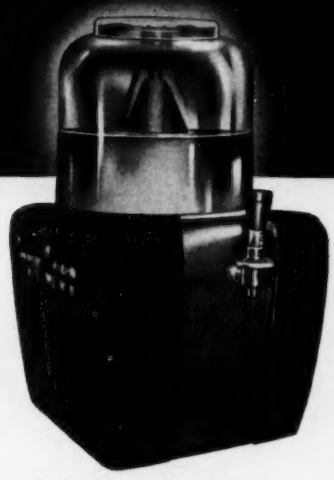
HALE & KULLGREN, INC. 326 S. Main St., Akron 10, Ohio

HALE AND KULLGREN INCORPORATED
AKRON, OHIO

ASSOCIATED WITH
THE AETNA-STANDARD ENGINEERING CO. · PITTSBURGH, PA.

For Large Injection-Molded Parts . . .

PLEXIGLAS



Bowl and cap for Snow Crop dispenser, molded of clear PLEXIGLAS "V". Bowl is 10½" high, has base diameter of 12¼", weighs 4.25 pounds. Injection molded on 200 oz. Watson-Stillman machine by A. L. Hyde Company, Grenloch, N. J., for Oiljak Manufacturing Company, Montclair, N. J.

PLEXIGLAS is a trade-mark, Reg. U. S. Pat Off. and other principal countries in the Western Hemisphere.

Canadian Distributor: *Crystal Glass & Plastics, Ltd., 130 Queen's Quay at Jarvis Street, Toronto, Ontario, Canada.*

. . . First, because PLEXIGLAS has the right *molding* properties for successful use in big injection presses. Note this large bowl for Snow Crop frozen juice dispensers. Thanks to the excellent flow characteristics of PLEXIGLAS, thousands of these bowls have been produced, molded to close tolerances at good production rates.

. . . Second, because the *physical* properties of PLEXIGLAS insure fine appearance and performance in a molded part. Here, the requirements of exceptional clarity, resistance to chemical action, dimensional stability, and strength to withstand sudden impact, were met by use of this Rohm & Haas acrylic plastic molding powder.

Clear and colored PLEXIGLAS is being used for more and more big moldings such as bowls, car visors, diffusers for lighting fixtures, and coin phonograph panels. If *you* want the best results in molding a large part, try PLEXIGLAS . . . for size.

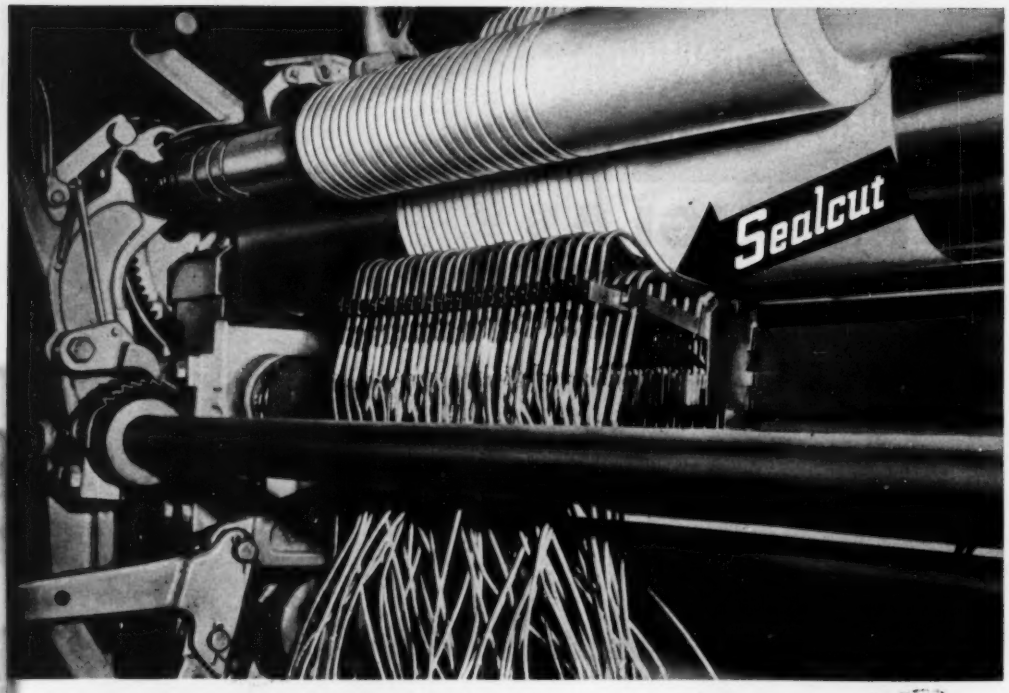
CHEMICALS FOR INDUSTRY

We'll be glad to send you our technical literature on PLEXIGLAS powders for injection and extrusion molding—and to discuss your specific application. Write us about your problem.

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries



FUSED EDGES *prevent fraying*

on acetate rayon strip . .

The new Camachine SEALCUT slitter unit is designed for use wherever acetate rayon fabric must be cut into strip and wound into clean, finished rolls. Used as the cutting elements on slitting-rewinding machines, the SEALCUT units employ electrically heated blades which separate the fabric into narrow strip. *SEALCUT heat seals* the edges of the strip instantly as it is cut. SEALCUT slitter units operate efficiently at speeds up to 250 fpm, and may easily be set to slit strips to any width, from ¼" up, across the full width of the fabric.

The cutting edge of the SEALCUT unit is a straight blade, electrically heated under positive temperature control. The heated blade separates the fabric by *melting* a razor-thin slit as the fabric passes between the blade and the rewinder platen roll.

Fusing is confined to minute edges on each side of the separation. These edges cool instantly after separation, with no apparent beading and no danger of fused layers in the rewound rolls. SEALCUT strip winds into smooth, clean-cut rolls, while the sealed edges provide strong resistance to fraying and ravelling in future use.

The SEALCUT acetate rayon slitter unit is recommended for use with the Camachine Type 26-3 Slitter-Rewinder.

Sealcut

ELECTRICALLY HEATED

ACETATE RAYON

SLITTER-FUSER

Camachines and Camachine attachments are backed by Cameron Machine Company's half century of specialization in the design and manufacture of better roll production equipment for paper, textiles, rubber and plastics.

CAMERON MACHINE COMPANY • 61 Poplar Street • Brooklyn 2, N. Y.

AA-249

You can depend on **Camachines®**

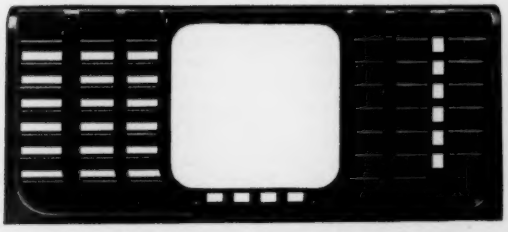
Plastics . . . . .
"on the beam"

WE OPERATE on a very high frequency of plastics molding assignments from manufacturers in the radio and electronics field. Their confidence in our ability to best serve them in this specialized field is expressed in two ways . . . our large number of repeat assignments . . . the variety of these assignments.

This grille, molded for the new Zenith Trans-Oceanic portable radio, is an excellent example of our injection molding skill in the radio field. Its molding demanded tolerances requiring "on the beam" exactness.

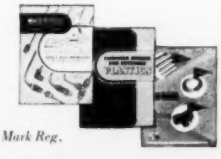
Elmer E. Mills Corporation engineers will treat your particular plastics molding problem with similar "on the beam" exactness.

Your finished product will be both a source of pride and profit to you. Investigate our injection molding and extrusion services today.



Grille, Molded for the New Zenith "Trans-Oceanic" Portable Radio.

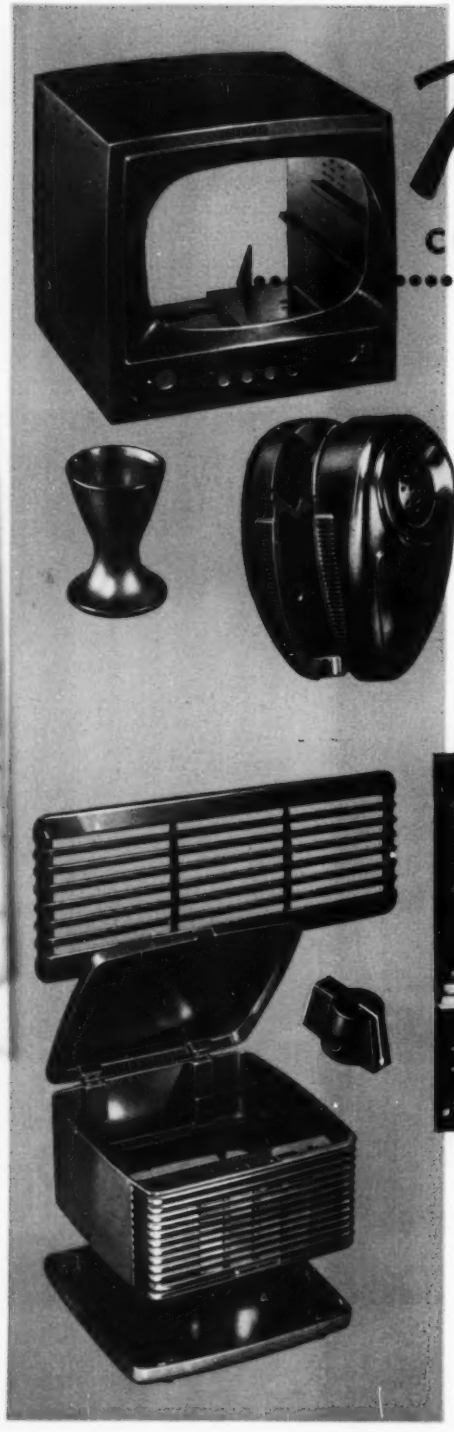
Write on your letterhead for the new Injection Molded and Extruded Plastics Catalog. Or, for detailed information about Cellulose Acetate, piping, tubing and fittings, write for circulars containing data and illustrations. *Trade Mark Reg.*



ELMER E. MILLS CORPORATION

INJECTION MOLDED and EXTRUDED Thermo-Plastic Materials Including Cellulose Acetate, Cellulose Acetate Butyrate, Acrylates, Methacrylates, Styrenes, Vinyls, Vinylidene Chloride, Cellulose Propionate *

2930 NORTH ASHLAND AVENUE • CHICAGO 13, ILLINOIS



Plastics

CUSTOM-MOLDED by MPc

Everything from the Smallest Parts to the Largest Available Anywhere...

Tiny or giant size, molded plastic parts are finding ingenious new applications...especially since the pinch on hard-to-get metals. Forget yesterday's limitations on the use of plastics! Investigate the new molding materials, the new reinforcing materials...and the new molding techniques developed at **MPc**.

Here at **MPc**, hard-to-handle molding problems are met with inventive engineering skill...supported by unmatched molding and tool-room facilities. The 17 inch television cabinet, complete with slide louvers, assembly holes, mounting rails and studs is produced in a single economical operation. The record player cabinet is made in three pieces that align perfectly for easy assembly. Metal inserts are accurately molded into the small knobs. Submit your plastics product or problem to:

MOLDED PRODUCTS CORPORATION
4535 W. Harrison St., Chicago 24, Ill.

FREE "Data Book of **MPc** Facilities," an engineering-eye view of **MPc** production facilities...together with a survey of **MPc** special skills available for your use. Write for your copy.

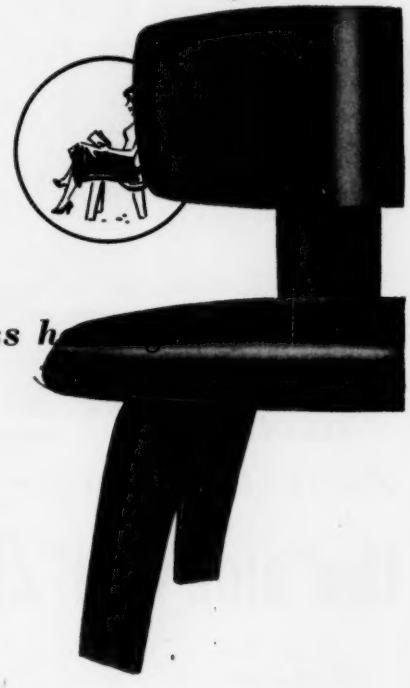
PLASTICS DIVISION
MOLDED MPc PRODUCTS
CORPORATION

...Pace-Makers in Plastics Molding

FOR FORMING

or

LAMINATING



Dowtherm

means accurate control in process h

Because DOWTHERM® heating means precision control, constant temperatures and uniform heat application, it makes possible new processes and new products.

In the plastics industry, DOWTHERM, used in molding plastic and rubber products, has improved product quality and reduced operating costs. Many production methods otherwise impossible can be utilized with DOWTHERM heating.

DOWTHERM speeds the heating cycle and at the same time reduces labor costs. Its outstanding characteristic is the accurate control it affords in obtaining temperatures between 300 and 750° F. at low pressures.

Are you fully acquainted with DOWTHERM's higher operating efficiency? We welcome the opportunity to discuss any process heat problems you may be confronted with. Write to Dept. DO 20 and ask for "The Dowtherm Story".

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

SPEEDS HEATING • IMPROVES PRODUCTION

DOWTHERM

DOW

CHEMICALS

INDISPENSABLE TO INDUSTRY AND AGRICULTURE

another
ZENITH preform—

the "side wall" ZENALOY gas meter cover

A new meter cover, for attachment to the side walls of residences or other buildings, has been developed to meet the needs of localities where climatic conditions make it inadvisable to install gas meters and regulators directly on the ground.

Made of a new material, Zenaloy,* composed of glass fibers and polyester resins, these meter covers combine handsome appearance with great strength and lightness — one-fifth the weight of steel, 25% lighter than aluminum, and one-tenth the weight of a concrete unit.

The "side wall" meter cover is one of many practical, economical products of Zenith preform engineering.

If you are interested in finding out how this reinforced plastic technique can effect similar improvements and economies in the production of your parts or products, consult the Engineering Division of

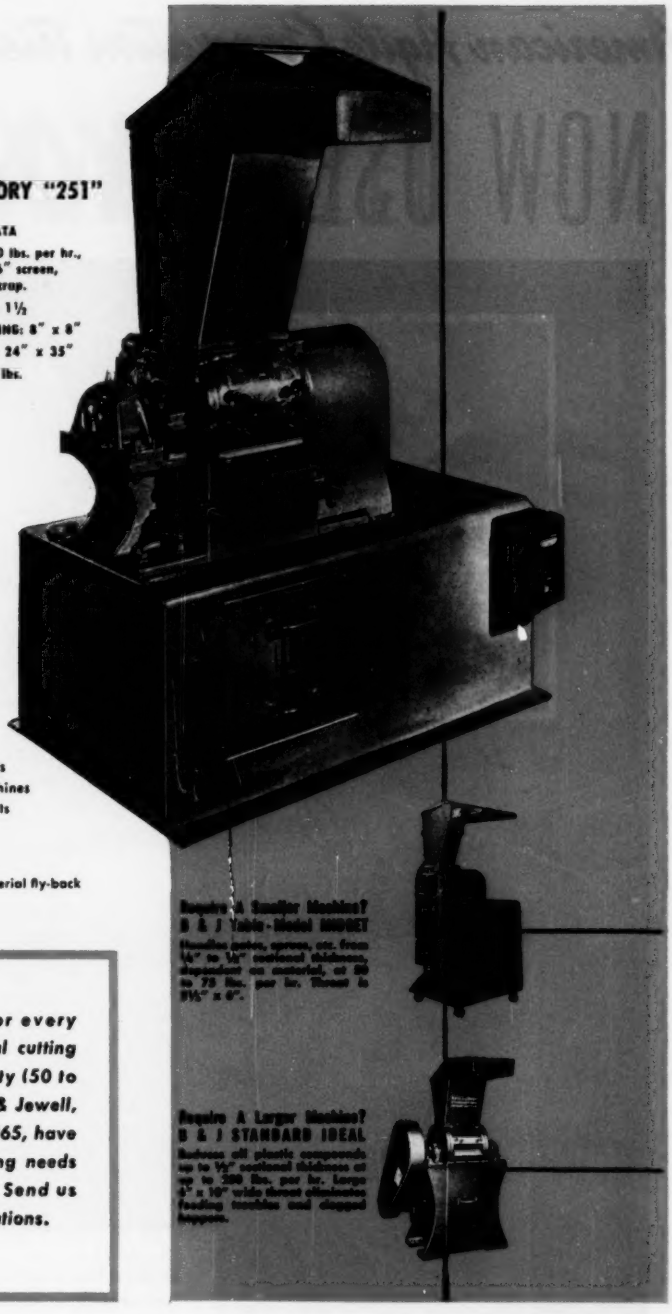
ZENITH PLASTICS CO. Z gardena, california

**ZENALOY is the trade name for the Reinforced Plastic Products manufactured by ZENITH PLASTICS CO.*

LABORATORY "251"

TECHNICAL DATA

CAPACITY: 150 lbs. per hr., based on 5/16" screen, polystyrene scrap.
HORSEPOWER: 1½
THROAT OPENING: 8" x 8"
FLOOR SPACE: 24" x 35"
WEIGHT: 630 lbs.



SPECIAL DESIGN ADVANTAGES

- For small plants with varied requirements
- For mounting beside large molding machines
- Engineered to cut large, thin section parts without pre-cutting
- Hopper hinged for rapid opening . . . facilitates cleaning
- New drop-leaf in hopper to prevent material fly-back

Your grinder source for every individual plastic material cutting requirement and capacity (50 to 3,000 lbs. per hr.)—Ball & Jewell, machine builders since 1865, have always paced the grinding needs of the plastics industry. Send us your requirement specifications.

Require A Smaller Machine? B & J Yasio-Model MIDGET

Handles purges, sprues, etc. from 1/8" to 1/4" scattered thickness, dependent on material, at 50 to 75 lbs. per hr. Throat is 5½" x 6".

Require A Larger Machine? B & J STANDARD IDEAL

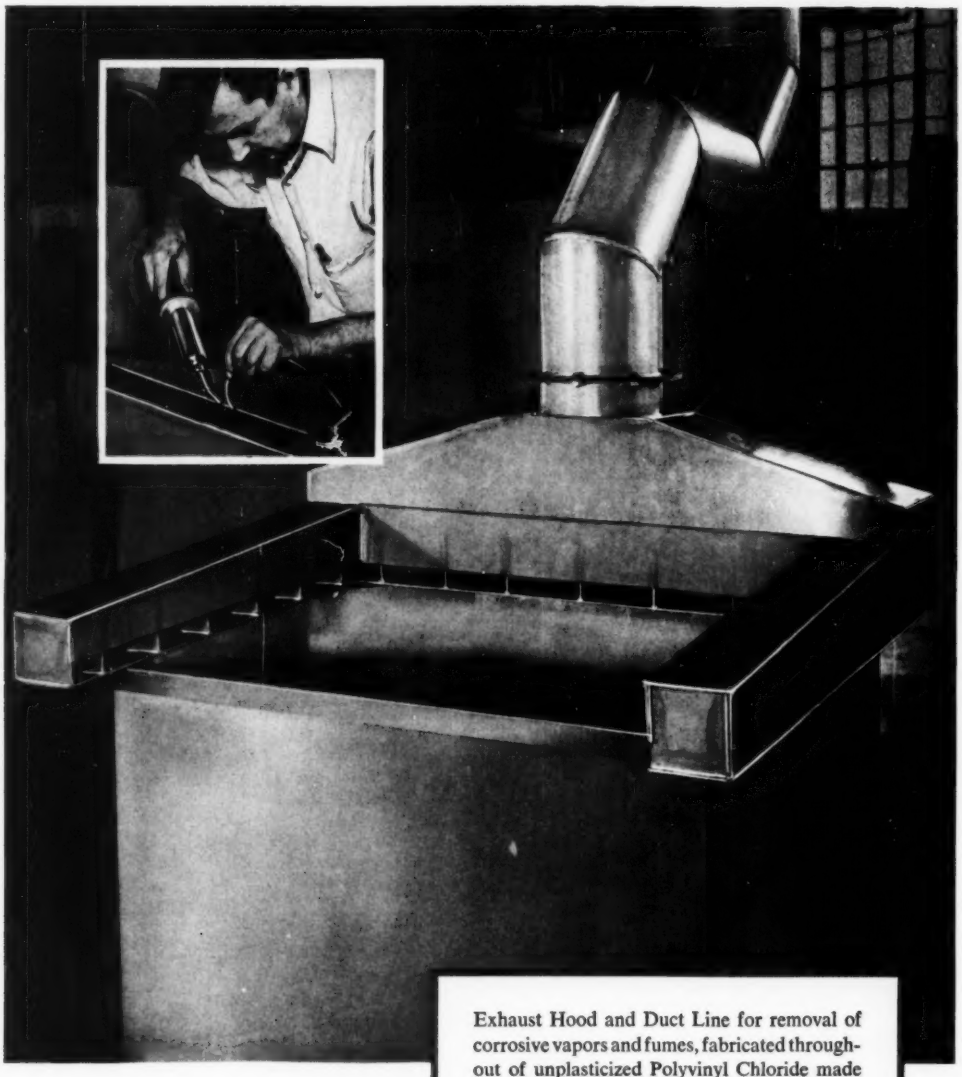
Reduces all plastic compounds up to ½" scattered thickness at up to 3500 lbs. per hr. Large 6" x 10" wide throat eliminates feeding troubles and clogged hoppers.

BALL & JEWELL, INC., 22 FRANKLIN STREET, BROOKLYN 22, NEW YORK

Leadership Through Continuous Engineering Improvements

American Agile Corporation tried them all...

NOW USES *EXON 402*



Exhaust Hood and Duct Line for removal of corrosive vapors and fumes, fabricated throughout of unplasticized Polyvinyl Chloride made with EXON 402, by a combination of various fabrication processes, including welding.

FOR UNPLASTICIZED VINYL APPLICATIONS!

At last! A dependable domestic source for unplasticized P.V.C.

Mr. Joseph Huscher, Technical Director of American Agile Corp., says: "After exhaustive testing, unplasticized vinyls made from Firestone EXON 402 have proven to be superior in every way... assuring satisfactory performance in all applications for this new material of construction."

When one of the country's foremost processors and fabricators of unplasticized vinyls endorses a material... this fact speaks for itself. And now, Firestone is happy to report the availability of EXON 402 in *unlimited commercial quantities.*

You can weld, saw, shear, stamp, mill, plane, emboss, roll, cement unplasticized vinyls made from EXON 402. You can produce this vinyl in sheet form, suitable for lamination into plates. Colors can be blended directly into the formulation and can't possibly wear off or be scraped off.

Firestone EXON 402 is excellent for extruding rods, piping, shapes. In fume ducts, tank liners and similar applications, it is superior to customary metals because of its non-corrosive qualities. What's more, up to 90% weld-strength can be achieved with this new material of construction. Yet EXON 402 is inexpensive and easy to process.

For further details and engineering counsel on EXON 402 and the complete line of Firestone resins, call or write

CHEMICAL SALES DIVISION, DEPT. 2B
FIRESTONE PLASTICS CO., POTTSTOWN, PA.

PROPERTIES OF EXON 402

Physical Properties of EXON 402 Resin

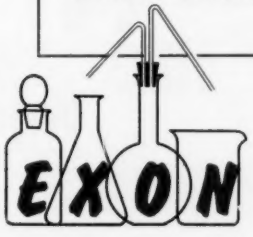
Form	White Powder
Specific Gravity	1.41
Average Bulking Density, gm./c.c.	0.55
Average Relative Viscosity	2.05

Physical Properties of Unplasticized Laminated EXON 402 Sheets

Tensile, psi	9000-9500
Rockwell Hardness	R105-R110
Heat Distortion, °C.	75
Izod Impact, ft.-lbs./in. @ 25°C.	0.5-1.0
Flexual Modulus, psi	$4.8\text{-}5.0 \times 10^5$

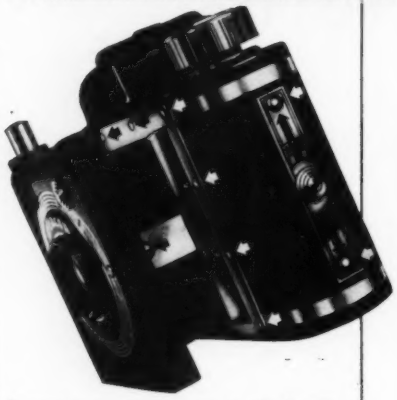
Electrical Properties of Unplasticized EXON 402 Sheets

Volume Resistivity, ohm-cm 50 mil plaque at 90°C.	1.3×10^{14}
Dielectric Constant 1000 cps—23°C.	3.25
Loss Factor 1000 cps—23°C.	0.072
Dielectric Strength, volts/mil In oil at 265°C.—30 mil plaque	725



This man can show you . . .

How to eliminate needless operations that slow up assembly hands



Because no tapping or inserts in plastic parts slowed production of this camera, assembly costs were greatly reduced. Sixteen P-K Type U Drive Screws were pressed into blind, untapped holes to assemble sheet metal and Bakelite parts. Two P-K Type Z Screws fasten the periscope extension box.

Type U Hardened Drive Screw, one of five standard types of P-K Screws. For permanent fastenings in castings, heavy gauge sheet metal, and plastics.

Ask a P-K Assembly Engineer to help you "question every fastening". He'll show you where tapping for machine screws, inserts in plastics, and awkward bolting or riveting are wasting time, boosting costs.

His experience is based on more than a million P-K applications. He can quickly determine which Self-tapping Screw, from Parker-Kalon's complete line of *standard* types, will help you make better, faster, stronger assemblies, at lower cost.

Today, more than ever, the P-K Assembly Engineer is a good man to have on your production team, helping you boost output and beat the squeeze on profits. He'll call at your request. Parker-Kalon Corporation, 200 Varick St., New York 14.

DELIVERIES ARE BETTER
SPECIFY P-K

Your INDUSTRIAL SUPPLY DISTRIBUTOR . . . *your local source for P-K Screws . . . works side by side with the P-K Assembly Engineer. Their combined efforts are solving many difficult problems of planning and procurement. Let them help you.*

P-K
TRADE MARK
REG. U.S. PAT. OFF.

PARKER-KALON®

The Original **SELF-TAPPING SCREWS**

FOR EVERY METAL AND PLASTIC ASSEMBLY

HERE'S THE *Difference* IN NRM EXTRUDERS . . .

Extrusion is a fast-moving process. New plastics — new applications — require new techniques — new equipment. NRM's engineers gave you the first extruder exclusively designed for thermoplastics. They've kept pace with the progress in plastics to give you the only full line of equipment to handle all plastic extrusion jobs.

Plus

Extrusion is a precise process. It requires exactly engineered and precision-built equipment. NRM's craftsmen have long experience in the manufacture of quality extruders. They build accuracy, dependability, and long life into your equipment.

Creative engineering and fine workmanship go hand in hand. Expert design means nothing, if not properly executed. Quality workmanship is wasted on poor design. At NRM, progressive engineering and true craftsmanship are closely integrated to give you the finest in plastics extruders.

Learn more about the products of creative engineering and fine workmanship, today. Write to NRM's extrusion experts for full information on plastics extruders and auxiliary equipment. Let them show you how to get better extrusions with better equipment.

2645

NATIONAL RUBBER MACHINERY COMPANY

General Offices & Engineering Laboratories: Akron 8, Ohio

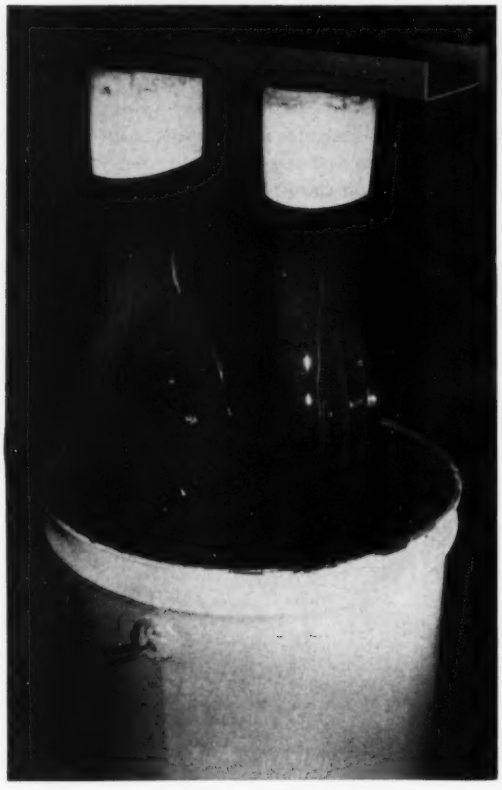
East: 1180 Raymond Blvd., Newark, N. J.

West: S. M. Kipp, Box 1141, Pasadena 18, Cal.

Export: Omni Products Corporation, 460 Fourth Ave., New York 16, N. Y.

NRM *Creative Engineering*

Another new development in AMERICAN ANODE *materials*



LOOK! cold dipping is here

New controlled viscosity plastisol simplifies production

HOUSEHOLD gloves are just one of the items made by cold dipping with this new plastisol . . . Ameran CV-P (controlled viscosity plastisol). For it may be used on vertical forms for dipping plastisol, *without* heat treatment of the form. Flow characteristics permit close control and uniformity of film thickness.

You get another "first" with Ameran CV-P—uniform film with good elongation. And Ameran CV-P's viscosity is controlled—does not change in storage.

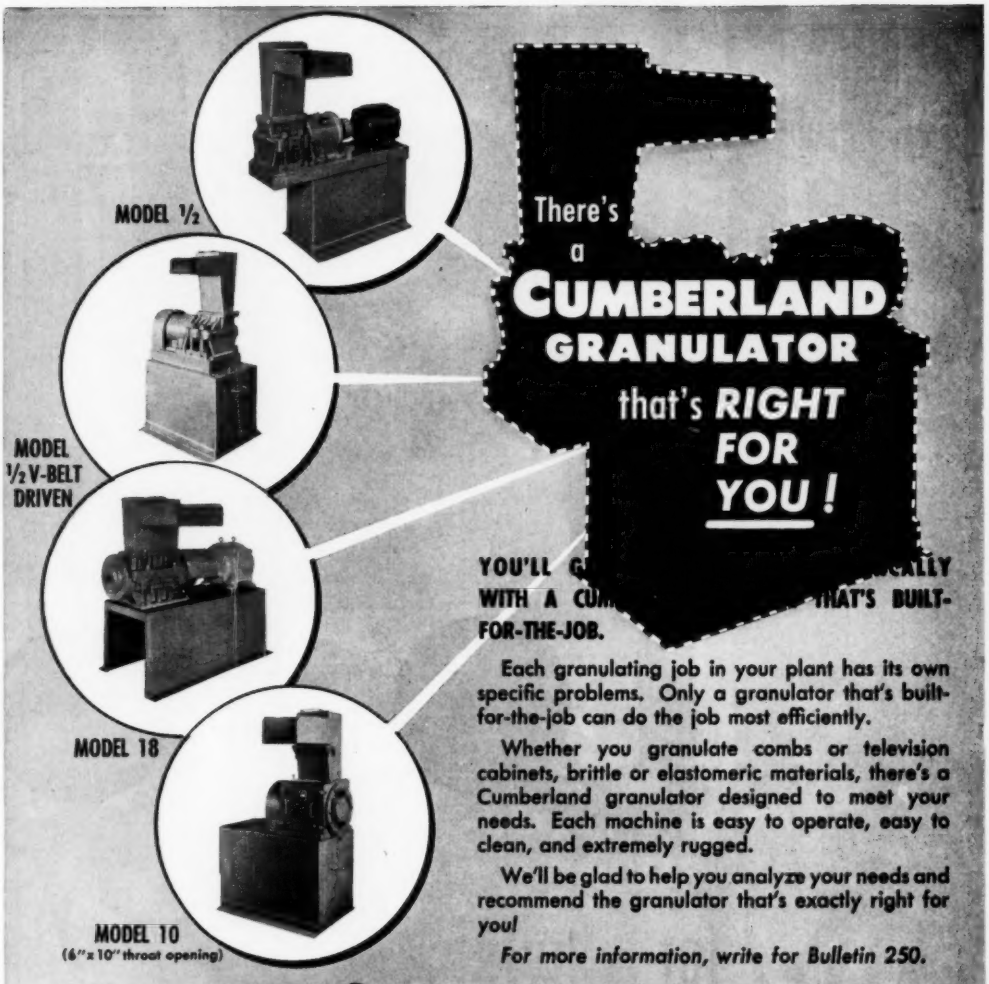
Think, too, of these additional advantages. Besides cold dipping, Ameran CV-P may be used for coating, molding or casting. Ideal for metal baskets, toys, canvas gloves, women's shoes and other saleable products!

Ameran CV-P can be made resistant to oils, greases, most chemicals and acids. No solvents are needed—no fire hazard. No recovery system. Can be compounded in a wide range of colors, including white. Check over the ways you can use this versatile new material. Then write us for technical advice or samples. Just address Dept. AC-4, American Anode, 60 Cherry Street, Akron, Ohio.

AMERICAN ANODE

A Division of The B. F. Goodrich Company

CRUDE AND AMERICAN RUBBER LATICES, WATER CEMENTS AND SUSPENSIONS, AMERAN RESIN PASTES, COMPLETE MANUFACTURING FACILITIES



There's a **CUMBERLAND GRANULATOR** that's *RIGHT FOR YOU!*

YOU'LL G… …CALLY WITH A CU… …THAT'S BUILT-FOR-THE-JOB.

Each granulating job in your plant has its own specific problems. Only a granulator that's built-for-the-job can do the job most efficiently.

Whether you granulate combs or television cabinets, brittle or elastomeric materials, there's a Cumberland granulator designed to meet your needs. Each machine is easy to operate, easy to clean, and extremely rugged.

We'll be glad to help you analyze your needs and recommend the granulator that's exactly right for you!

For more information, write for Bulletin 250.

OTHER CUMBERLAND MACHINES

NEW PREBREAKER

Cuts up radio, television cabinets and other large parts. Two machines available: Model 32 (20" x 32" throat opening); Model 24 (10" x 24" throat opening). Write for details.

ROTARY CHOPPING MACHINE

Heavy duty, rugged machine. Used for cutting thick vinylite slabs from two roll mills. Also used as large capacity pelletizer. Other applications are described in Bulletin 400.

PELLETIZING MACHINE

Smaller, companion model to Rotary Chopper. Designed specifically for use with continuous extruders. Gives efficient, trouble-free performance. Write for complete details.

CUMBERLAND *Engineering Company, Inc.*

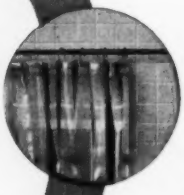
BUILDERS OF BETTER MACHINES FOR THE PLASTICS INDUSTRY

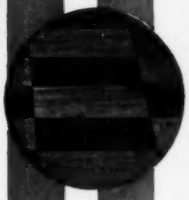
DEPT. I • BOX 216 • PROVIDENCE • RHODE ISLAND

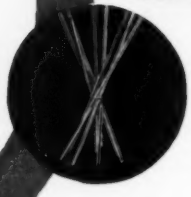
California Representative:
WEST COAST PLASTICS DISTRIBUTORS, INC.
2325 Jesse Street, Los Angeles 23, Cal.

plasticizer

HB-40







OK for vinyls...

OK and available now in drum or carload lots, Monsanto HB-40 will help you lower your vinyl production costs without any sacrifice in quality. A partially hydrogenated terphenyl, HB-40 is used as a coplasticizer, or as an extender for primary plasticizers in—

VINYL EXTRUSIONS—Profile, tubing, belting and wire coating, both electrical and nonelectrical...VINYL PASTES—Organosols and plastisols, for fabric coating, free film, floor coverings and dip coatings . . . VINYL SLUSH MOLDINGS—Plastisols for slush molding operations . . . VINYL CALENDERING—Thin film and sheeting, both supported and nonsupported.

For full information on physical properties, application and use of HB-40, get Technical Bulletin P-104 . . . Contact any Monsanto District Sales Office, or write MONSANTO CHEMICAL COMPANY, Phosphate Division, 1700 South Second Street, St. Louis 4, Missouri.

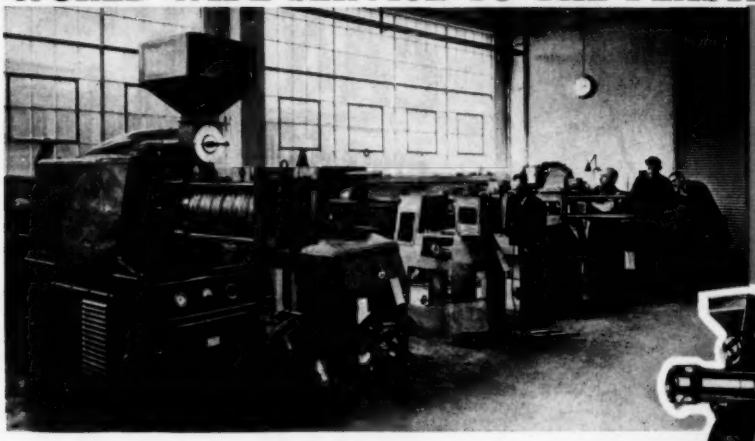
DISTRICT SALES OFFICES: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto (Canada) Ltd., Montreal.

MONSANTO
CHEMICALS—PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

Windsor

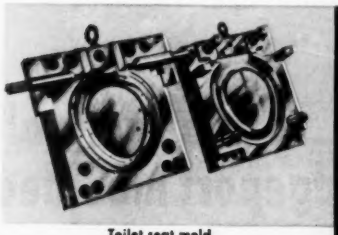
WORLD WIDE SERVICE TO THE PLASTIC INDUSTRY



R. C. SERIES Triple-Screw Compounder Extruders

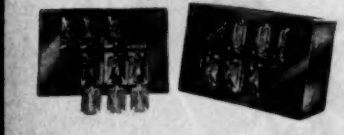
- A corner of the new Windsor extension plant showing the R.C. series compounder extruders in production.
- Plastic industries throughout the country are discovering new economies through using improved R.C. 65. Full details and specification will be mailed you on request.
- Windsors' also welcome inquiries for molds, dies and crossheads, our mold department employ some of the best craftsmen in Britain.

R·C·65
(Manufactured under L.M.P. Patents)

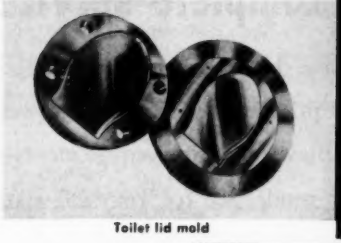


Toilet seat mold

PRECISION
MOLDS
FOR
INJECTION PRESSES
EXTRUSION DIES
CROSSHEADS
AND EQUIPMENT

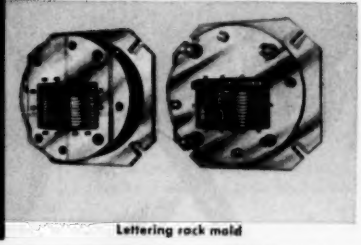


Angel mold



Toilet lid mold

Operator polishing mold



Lettering rock mold

Exclusive U·S·A Representative
F. J. STOKES MACHINE COMPANY PHILADELPHIA 20, PENNSYLVANIA

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Bridgeport Moulded Products, Inc.

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TOOL STEEL

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Crucible mold steel *is* better. It's tool steel.

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TRADE-MARK

plasticizer CC-55

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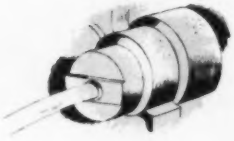

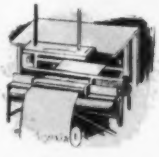

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You can count on the availability of CC-55, because it is made 100% from basic CARBIDE raw materials. Find out about this new plasticizer today. Ask any Carbide and Carbon office for the technical bulletin, F-7893A, or simply fill out and mail in the coupon.

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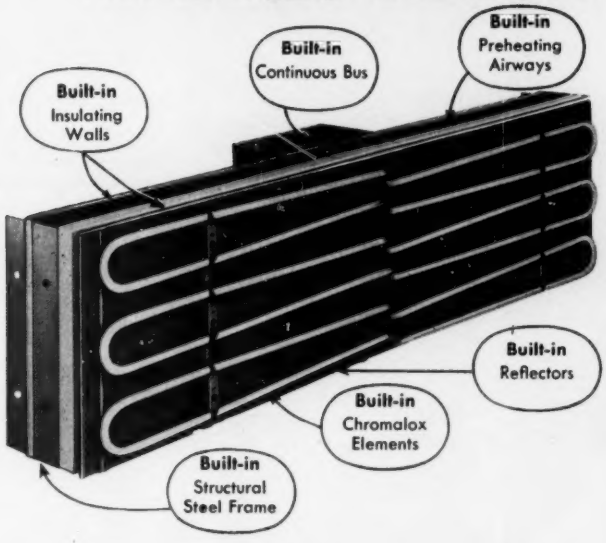
Announcing a new and better *INFRARED* Generator



CHROMALOX *Electric* RADIANT PANELS

Now, more efficient *far*-infrared comes in convenient pre-engineered panels, reducing oven building to a matter of determining heat requirements and assembling panels to fit the job.

CHROMALOX Electric Radiant Panels generate more uniformly absorbed *far*-infrared heat with quick heat-up and reduced oven lengths.

It's the *far*-infrared wave length that makes the difference.

- ✓ 9200 Btu's per square foot output per hour.
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- ✓ Lowest installed cost per kilowatt and per square foot.
- ✓ Work temperatures to 700° F. easily obtained.
- ✓ Accurate "dialed" control.
- ✓ Absolutely uniform radiation—no hot or cold spots.
- ✓ Built to UL and NBFU requirements.

NOW. . . Oven Building as Simple as A B C

It's easy to build ovens of any desired height and length with lightweight Chromalox Electric Radiant Panels. Panels come in 1 x 4 ft. and 2 x 4 ft. sizes, ready to erect and connect with easy-to-follow instructions in each carton. Chromalox on-the-spot engineering assistance to help determine your requirements is yours—no obligation, of course.

CHROMALOX *Electric Heat*

Does More - Better - Consistently

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9 WAYS BETTER

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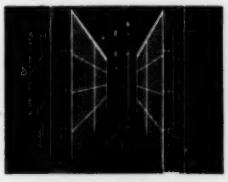
2. **Shatter-proof construction**—nothing to break and contaminate.
3. **Non-diminishing output** from all-metal Chromalox tubular heat generators.
4. **Uniform heat**—no hot or cold spots.
5. **High intensity radiation**—with more watts per square foot.
6. **Quick heat-up** with energy transformed instantly into heat on the work.
7. **Low-cost oven assembly.**
8. **Infinitely variable output**—from 0 to 100% of capacity.
9. **Additionally safe** for any work involving volatiles.



Easily erected banks of Chromalox Radiant Panels are ideal for line production. *Far*-infrared heat is radiated directly and uniformly without hot spots over entire work area.

Chromalox Radiant Panels can be erected into any oven shape. Rugged construction permits their use in assembly lines, even when hazards of splashed liquids, volatiles and moisture are present.

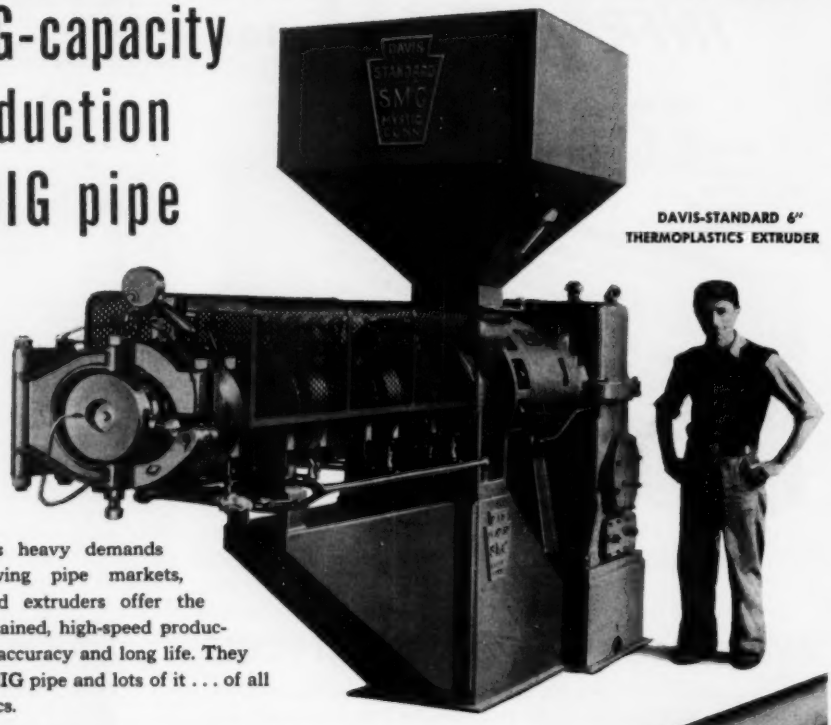
Get this Bulletin

It contains complete information, specifications and application ideas for the use of Chromalox Radiant Panels. Write for your copy today.

IC-66

BIG DAVIS-STANDARD EXTRUDERS

for BIG-capacity production of BIG pipe



DAVIS-STANDARD 6"
THERMOPLASTICS EXTRUDER

For today's heavy demands and fast-growing pipe markets, Davis-Standard extruders offer the utmost in sustained, high-speed production capacity, accuracy and long life. They can produce BIG pipe and lots of it . . . of all kinds of plastics.

These famous thermoplastics extruders have been designed and built to highest standards. The most efficient operating velocities are achieved with exclusive Davis-Standard Stream-Flo heads. Sectional type cast-steel cylinders afford precise temperature control. Therma-Fin* heating jackets — another exclusive — are equipped with heating elements and cooling coils that permit any desired operating condition.

Easy to operate and to maintain, these machines have many other features which include stock screws of special steel alloy and V-Belt or flexible coupling drive to enclosed worm reduction gear. Davis-Standard extruders are supplied complete with control panel ready to install.

*Potent Pending

Let us know your equipment needs or problems. Our engineers are glad to cooperate with yours to give the best installation for your operation.

SMC EST. 1848

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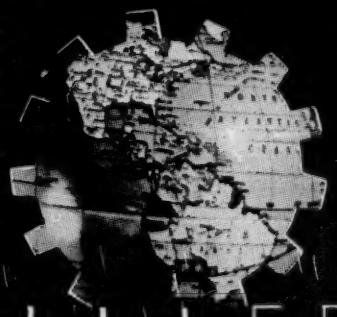
DRYCOL —offered as Gering's perfected dry coloring medium for in-plant coloring of ALL PLASTICS. No special skill or equipment needed. Standard, Special and Metallic colors available or to order.



GERING *Products*

NEW PHENOLIC *with minimum impact strength of 1.05* that can be automatically preformed*

**1.05 ft. (min.) lbs./in. of notch*

Here at last is a high impact phenolic molding compound that is almost as easy to preform and mold as general purpose materials. This new material, like other Rogers impact phenolics, is formulated specifically to facilitate high speed production of high strength molded parts.

Preforms can be made on standard tabletting machines and the "pills" are not only hard but can be held to close weight tolerances. This ready preformability of RX 431 permits electronic preheating when desired for improving electrical characteristics and shortening molding cycles.

Clean and dustless, this new material is pleasant as well as easy for personnel to handle. Its molded appearance rates as good.

Complete specifications for RX 431 are available on request. Please write Dept. P, Rogers Corporation, Manchester, Conn.

Better Parts for Better Products

ROGERS
CORPORATION
Established in 1832

Ideal

CUSTOM MOLDING

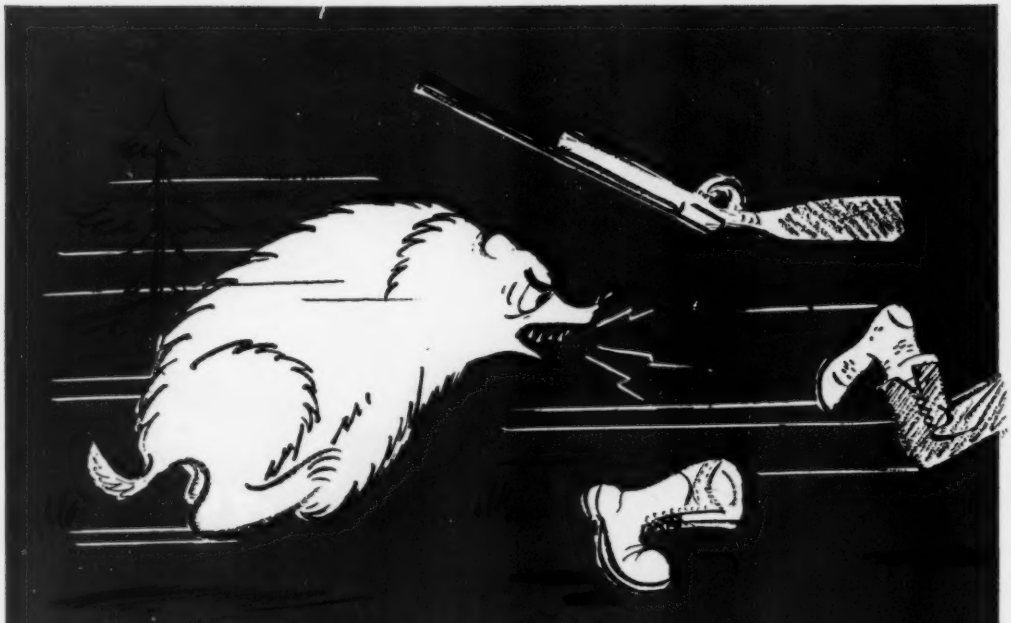
Transforms your

THE CARE, CONSIDERATION and efficiency with which Ideal Plastics transforms your plans into products is a source of never-ending gratification to our customers. Every detail, from design and manufacture of the molds by Ideal's skilled craftsmen to giving your moldings the desired finish and decoration, is handled with the assured expertness that comes from being the world's largest, best equipped custom injection molder.

. . . And more than that, Ideal has built its structure so every phase of each job is supervised on an individual basis, by a competent, trained "Job Manager" who has complete charge and responsibility. The result is that even though thousands of jobs go through the Ideal plant, each one is processed with genuine "custom" treatment. Ideal never sacrifices personal attention for mass production; instead we maintain them both side-by-side.

A sound idea of what Ideal injection molding can mean to you in terms of having your products produced exactly as you want them, at low cost, and with an absolute minimum of "headaches," can be gained by asking us for an estimate. For prompt attention, just direct your inquiry to A. C. Manoville, Vice-President in Charge of Sales, IDEAL PLASTICS CORPORATION, 184-10 Jamaica Avenue, Hollis 7, New York. Phone: AXtel 7-7000. Mid-West Representative, Steel Mill Products Co., 176 West Adams Street, Chicago 3, Illinois. Phone: CEntral 6-5136.

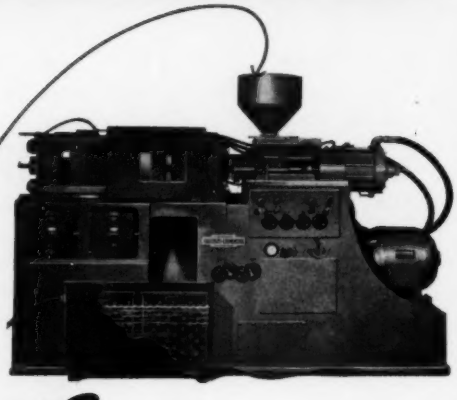
Better Molded Plastics Ideal *for Industry & Home*



When speed counts...

IN PLASTICS MOLDING speed means money. And now, at last, rapid-fire plastics molding is a reality, thanks to the 10-shots-a-minute cycling of the Fellows 3 oz. machine. With the shots coming so fast that water quenching is often used for product cooling—production capacity goes way UP and costs go way DOWN!

Far ahead in cycling speed, automatic operation, and over-all machine economy, the Fellows 1B-3-15 may mean more money for you! For more information, write, wire or phone today!



Fellows

injection molding equipment

THE FELLOWS GEAR SHAPER CO., Plastics Machine Div., Head Office & Export Dept., Springfield, Vt. Branch Offices: 323 Fisher Bldg., Detroit 2 5835 West North Avenue, Chicago 39 • 2206 Empire State Bldg., New York 1 • New England Distributor: Leominster Tool Co., Leominster, Mass.

modified polystyrene—Koppers MC 401—bridges the gap!

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KOPPERS MC 401

REGULAR POLYSTYRENE

Molders have long wanted a thermoplastic which combines the toughness and shock resistance of "high impact" polystyrenes with the desirable characteristics of regular polystyrene. Koppers Modified Polystyrene MC 401 was developed to satisfy this need, and initial applications of this new Modified Polystyrene are being received enthusiastically.

Good shock resistance, toughness and finish suggest Koppers MC 401 for toys, refrigerator parts, household appliances and housewares as well as for battery cases and a wide variety of packaging applications. It is available in standard and special opaque colors.

Koppers MC 401 may be either injection-molded or extruded, and its molding characteristics, like its physical properties, combine the qualities of both regular and shock resistant polystyrenes.

Write for free Bulletin. C-2-161-T which details molding characteristics, physical and chemical properties and other information about Koppers Modified Polystyrene MC 401. This bulletin also contains information about Koppers Modified Polystyrenes MC 185 and MC 301. Koppers technical staff is anxious to help you develop new product applications for all Koppers Plastics. Phone, write or wire, and a Koppers representative will gladly call to discuss your problem.

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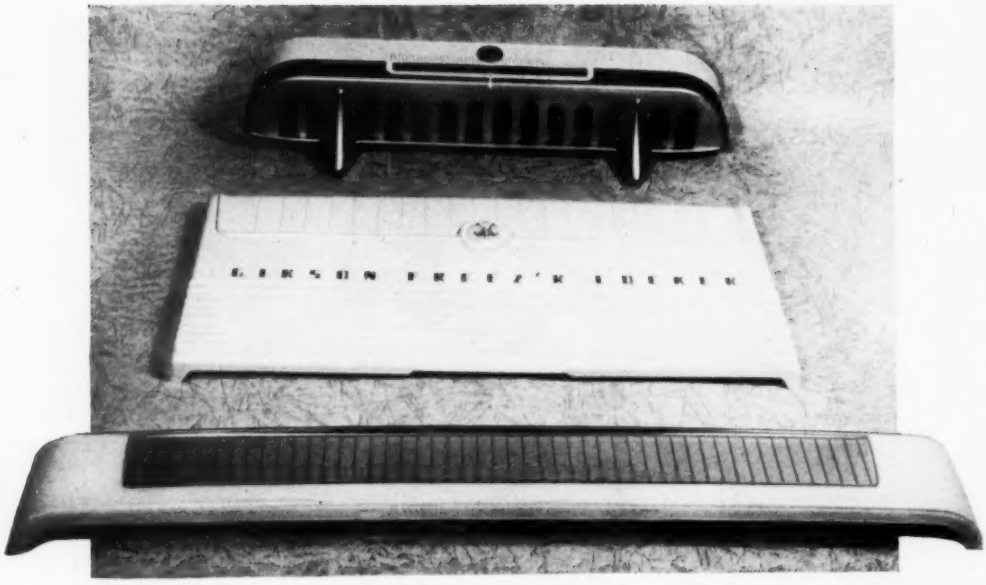

Plastics for Industry

Illustrated above are three decorative plastic pieces currently being molded for the Gibson Refrigerator Company, Greenville, Michigan. The parts are produced in polystyrene and decorated in color.

"Our facilities are available for the production of large refrigeration components such as evaporator doors, breaker strips, door baskets, trims, etc. We have capacity of up to 60-ounces and complete finishing facilities for all types of decorative work. Your inquiries are welcome and our engineers are at your service for consultation at all times."

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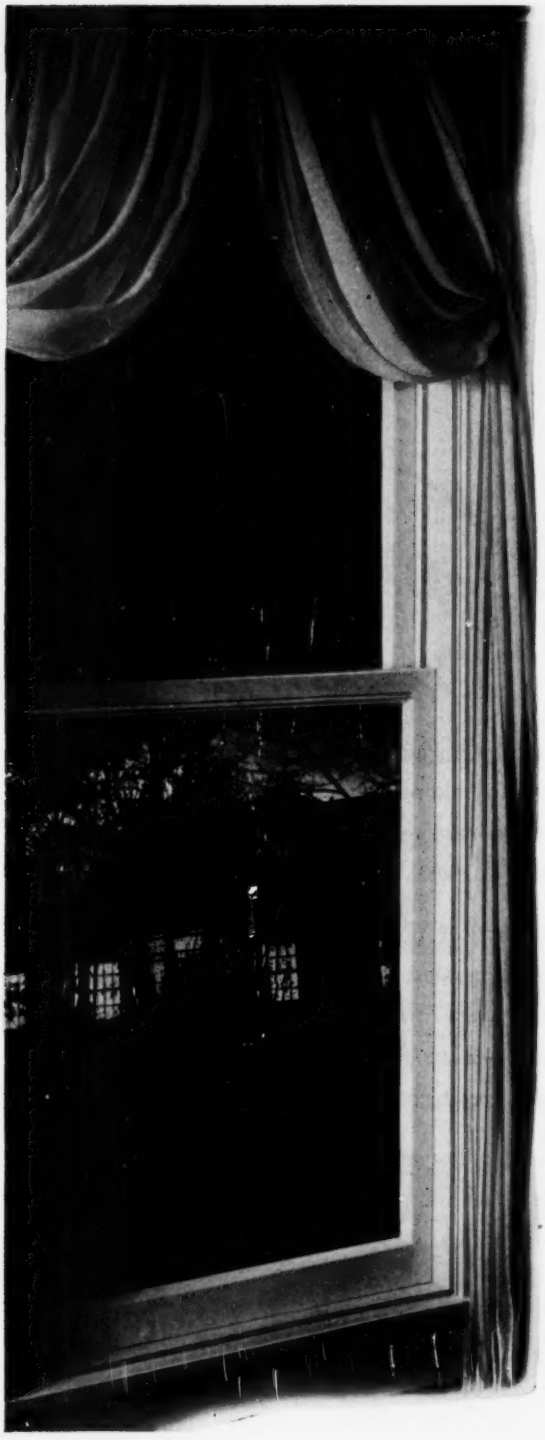
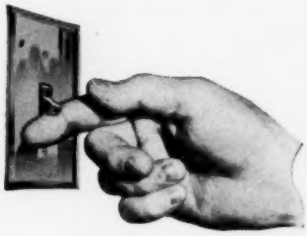


Gloom chaser . . . that works



Fair weather or foul, when you flip a light switch you *expect* light. You take it for granted. Actually, like a touchdown in football, the result is the triumph of teamwork in electrical apparatus.

The power company is the captain. The players include the manufacturers of generators, transformers, switch gear, and electrical fixtures. But an *unseen essential* called *Synthane* is present, too.

Synthane is a laminated plastic. It is an excellent electrical insulator. It is also a mechanical material that combines light weight and strength, a chemical-resistant material that machines easily.

Send for the complete Synthane Catalog. Then, if you find Synthane a material you can use, we will be glad to help you with design, sheets, rods, tubes or fabricated parts. Synthane Corporation, 8 River Road, Oaks, Pennsylvania.

Insulator (left) made from Grade X Black Synthane for Square D Company and switch mounting plate made for Cutler-Hammer Inc. of Grade GLCC-M Synthane. Both parts require good electrical characteristics.

Synthane-one of industry's unseen essentials

SYNTHANE

LAMINATED PLASTICS

Erinoid POLYSTYRENE

From the machines of one of the world's most modern plants Erinoid polystyrene goes out in sealed bags to the injection moulders, to widen and enrich the range of British plastics.

The physical properties of polystyrene—low specific gravity, inertness to humidity, resistance to temperature changes, very low electrical loss factor, high break-down voltage—make it the ideal moulding powder for a wide range of products, just a few of which are illustrated here.

Erinoid polystyrene excels in its full range of opaque, transparent and pearlescent colours.

Available in the form of moulding powder, sheet and rod

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And it's not from beer
Who do you see?
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And you wonder why
Who do you see?
Your Aunt Minnie?
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When your swindles fail
And you land in jail,
Who do you see?
Your Aunt Minnie?
No! a lawyer

When your car breaks down
And that blonde's in town
Who do you see?
Your Aunt Minnie?
No! a mechanic

When there're plastics to mold,
And there're troubles, you're told,
Who do you see?
Your Aunt Minnie ?
I'll bet you do!

Why in Hell you don't consult an experienced molder while you're in the design stage even Aunt Minnie can't tell us. Try it and see what Boonton plus thirty years can do to simplify and economize.

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at Plastic Engineering, Inc.

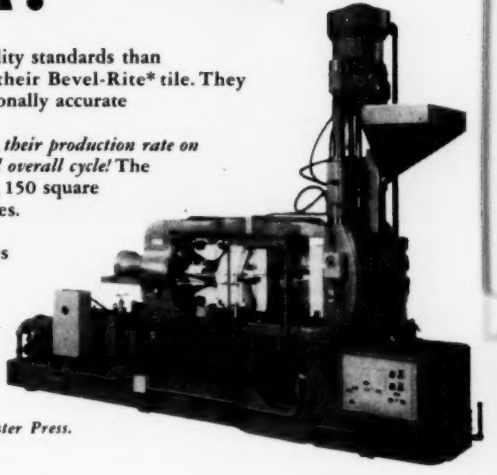
on a 20 oz. LESTER!

No tile molder in the country has higher quality standards than Plastic Engineering, Inc., in Cleveland has for their Bevel-Rite* tile. They demand and get strong, warp-free, clean, dimensionally accurate tile with a unique "cloud pattern" marbleization.

Yet, in spite of these rigid standards of quality, *their production rate on an L-3-15-20 ounce Lester is a phenomenal 18 second overall cycle!* The shot is eight cavities of 4-1/4 x 4-1/4 beveled tile, 150 square inches of projected area, weighing 6-1/2 ounces.

The L-3-15-20 ounce Lester, with its high speed toggle and enormous plasticizing capacity, provides every advantage for low-cost, high-quality tile molding. Our customers know that for *any* fine molding, they can count on their Lesters. Complete specifications on the machine of your choice is available on request.

*T. M. REG.



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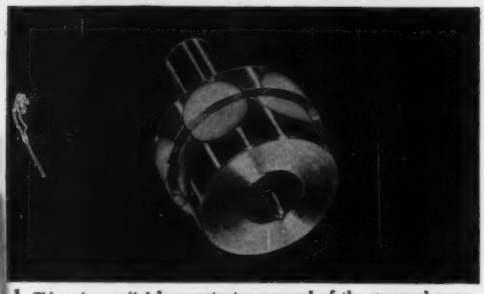
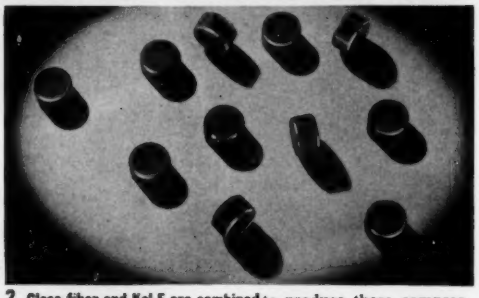
KEL-F Application Report #2

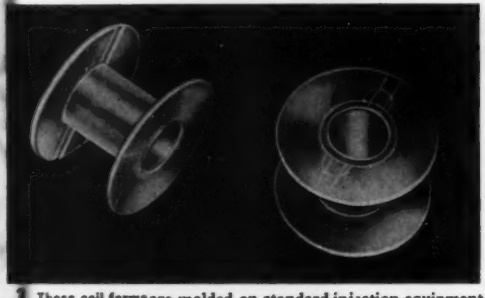
. . . how POLYTRIFLUOROCHLOROETHYLENE has been used to solve tough design problems.



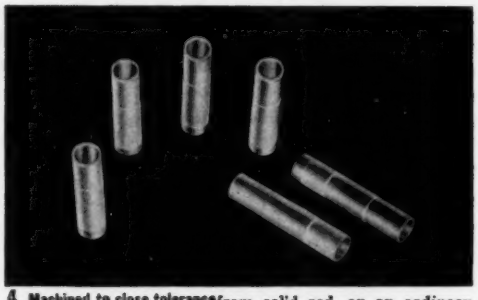
1. This rotary switch demonstrates several of the unusual properties that are winning a leading place for Kel-F in electronic applications. In production, Kel-F is injection molded into the metal switch case *around an intricate insert* . . . result —an hermetic seal between plastic and metal, *plus* high electrical resistance and dimensional stability.



2. Glass fiber and Kel-F are combined to produce these compression-molded valve seats for compressed-gas tanks. Kel-F's chemical inertness eliminates chance of corrosion problems. Its dimensional stability combines with that of the glass fiber to deliver finished parts that have minimum deformation over an extremely wide temperature range.



3. These coil forms are molded on standard injection equipment at very favorable production rates, again pointing up Kel-F's superior molding properties. Further reasons for specification of Kel-F in a rapidly growing list of such high frequency electronic applications are—performance at high temperature; excellent insulating properties; and zero moisture absorption.



4. Machined to close tolerance from solid rod, *on an ordinary automatic screw machine*, these bushings illustrate Kel-F's versatility. Such ready machinability combines with physical strength, chemical inertness, dimensional stability and electrical resistance to make Kel-F a sound specification for many types of chemical and electrical fittings.

A Capsule Report on the Properties of KEL-F

- ★ Chemical Inertness
- ★ Wide temperature range —minus 320 F to 390 F
- ★ High electrical resistance
- ★ Low Cold Flow
- ★ Zero Moisture Absorption
- ★ Variable transparency and flexibility properties
- ★ Readily molded, extruded and machined

Basic Kel-F Products Available

MOLDING POWDERS

Unplasticized

#300 . . for high temperature service

#270 . . for less severe temperatures

Plasticized *(in either #300 or #270)*

P 20 . . with 20% plasticizer

P 25 . . " 25% "

P 30 . . " 30% "

DISPERSIONS

NW-25 flows readily at fusion temperatures

N-1 High molecular weight

OILS, WAXES and GREASES

#1 . . Light Oil

#3 . . Medium Oil

#10 . . Heavy Oil

#40 . . Waxy Oil (pour point 80-90 F)

#150 . . Hard Wax at 70 F

(Greases compounded to order)

Standard Fabricated Kel-F Materials and Parts Available from Commercial Sources

Molded Sheets ★ Extruded and Molded Rod ★ Extruded Tubing
Thin Film (extruded as lay-flat tubing)
Gaskets ★ Washers ★ Valve Discs ★ "U" Packing
"O" Rings ★ Kel-F coated Resilient-core "O" Rings
Valve Diaphragms
Transformer Terminals ★ Rotary Electric Switches ★ Hook-up Wire
Electronic Terminals, Tube Bases and Coil Forms

For full information on various molders, extruders and fabricators of Kel-F products; also technical data on detailed properties, molding and application techniques — write

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Paints Knob, Dial & Grille
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Completely Assembles All Plastic and Metal Parts into Finished Product.

HIGH STYLING ALL THE WAY THROUGH—in unusual decorator tones set off by sparkling metallic gold plated plastic—Plus exact cabinet color match gleaming through lucite knob and polystyrene dial. Jewelry like precision molding representing the highest craftsmanship attainable in the industry...all blended together into this magnificent 1952 RCA Victor portable radio cabinet.

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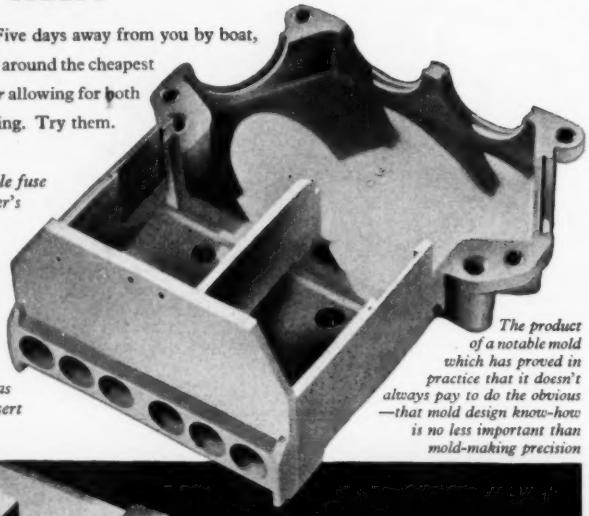
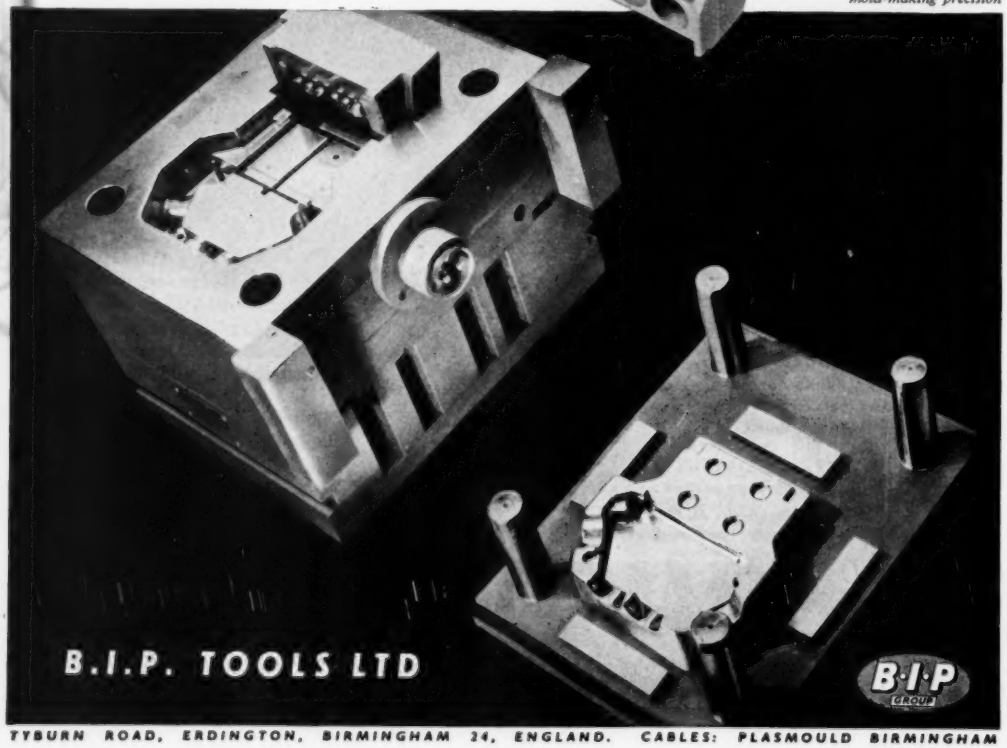
One component in a cut-out assembly, is this double-pole fuse base, molded by the makers, British Insulated Callender's Cables Ltd., England. This unorthodox mold is one of a pair working in tandem. It has made 250,000 moldings in a continuous run without adjustment or reconditioning of any kind and its counterpart has an equally good performance. The mold is unorthodox because conventional molding procedure has been revised so that insert carrying pins can be loaded into the lower instead of the upper die part. This has paid handsome dividends; the molding procedure has proved most efficient and no accident due to careless insert loading has occurred.



The product of a notable mold which has proved in practice that it doesn't always pay to do the obvious —that mold design know-how is no less important than mold-making precision



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size: 20" x 50"
thickness: .010", .015"
.020", .025", .030"
and heavier gauges
colors: transparent — clear or colored; translucent — colored or white; opaque — colored, white, black

SHEETS—RODS—TUBES

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Nixon C/N (cellulose nitrate)
Nixon E/C (ethyl cellulose)
Nixon C/A/B (cellulose acetate butyrate)

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size: 21½" x 51½"
thickness: .010", .015"
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CALENDERED ROLLS

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.010", .015"
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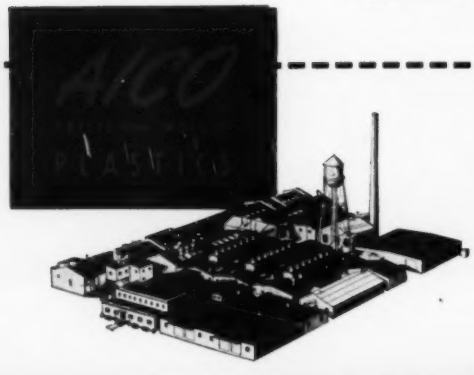

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MODERN PLASTICS

VOLUME 29 JULY 1952 NUMBER 11

No. 1 of a Series of Articles on the Economics of Plastics Sheet Forming—1952

Courtesy United States Rubber Co.

Fig. 1—Boat deck is made by heating styrene copolymer sheet material and pulling it over padded wooden form

HERE COME THE COPOLYMERS

THE young lady in the picture to the right (Fig. 1) is making the deck of a boat out of one of the newest plastics by means of one of the industry's oldest and simplest techniques.

At the Winner Mfg. Co. plant in Trenton, N.J., she is forming Royalite, U.S. Rubber Co.'s sheet styrene-butadiene copolymer, by heating it and pulling it tight by clamps on a jig, over a padded wooden form.

Mold cost: very low. Material cost: from two to three times that of a similar material in powder form, depending on the formulation of the sheet. Strength: you can jump on this deck, drop an anchor on it, or smack it into a dock with no damage to the plastic part. Length of run: in this case, small; but by other forming techniques, runs of thousands are practical and relatively low in tool costs. Dimensional accuracy: whatever is required.

Small wonder that a new and almost fanatical enthusiasm for formed sheet thermoplastics is being shown by fabricators and end users alike.

A range of eight basic thermoplastics materials in sheet form are competing at some economic stage with paper, cardboard, wood, aluminum, steel, leather, fabric, glass, plaster, rubber, and molded plastics. Sheet materials today being formed into products and product components are cellulose nitrate, cellulose acetate, cellulose acetate butyrate, the acrylics, vinyl chloride-acetate copolymer, styrene sheet, rigid vinyl, and styrene copolymer sheet. The number and variety of things being made from these sheet thermoplastics is tremendous. The list of possible applications is infinite.

This series of articles will deal

TODAY . . . and TOMORROW

Present-day applications (in black) of formed sheet styrene copolymers, and (in color) a few of the new applications under development or projected.

Automobile interior door panels.
Aircraft window frames.
Aircraft instrument panels.
Aircraft seat components.
Advertising signs and displays.
Air conditioning components.
Assembly devices.
Bowling bag bottoms.
Boat decks and seats.
Backs for automobile front seats.
Bridge table tops.
Business machine housings.
Baggage racks.
Basins.
Bulk head panels.
Bookbinding.
Cowl quarters for automobiles.
Chairs and chair bottoms.
Clothes hampers.
Cutting blocks.
Cases of all kinds.
Chemical containers.
Cabinet doors.
Clock housings.
Counter displays.
Camera shells.
Desk tops.
Deep freeze lids.
Dash panels.
Demonstration cases.
Ducts for industrial installation.
Drawers for storage units.
Football helmets.
Football pads.
Filing baskets.
Fishing buoys.
Food handling trays and boxes.
Freezer parts.
Gaskets.
Golf bag bottoms.
Game boards.
Gasoline containers.
Highway signs and markers.
Helmets.
Handbags.
Housings of many kinds.
Industrial seating.
Instrument panels.
Luggage.
Liners.
Letters for signs.
Newspaper mats.
Printing plates.
Picture frames.
Packaging.
Pie carrying racks.
Projector cases.
Refrigerator trays.
Refrigerator inner door liners.
Radio cabinets.
Radio grilles.
Roof panels for automobiles
Refrigerator drip pans.
Signs.
Shipping containers.
School seating.
Surgical cases.
Sinks.
Sewing machine cases.
Scuff pads and stone guards.
Stair treads.
Stool seats.
Sun visors.
Switchbox covers.
Typewriter cases.
Tote boxes.
Trays of all kinds.
Trunks.
Tractor seat covers.
Television masks.
Television tube protectors.
Toys—especially wheel toys.
Tackle boxes.
Toilet seats.
Telephone cases.
Terminal blocks.
Textile machinery parts.
Wall tile.

with the economics of various kinds of formed sheet thermoplastics applications, and the techniques used to produce them. It starts with the newest—the styrene copolymer sheets—because of their high current interest and because of announcements this month of new sheet copolymers.

There are three makers of styrene copolymer sheets: Bolta Products Sales Inc., Lawrence, Mass.; U.S. Rubber Co., Chicago, Ill.; and Dow Chemical Co., Midland, Mich. A few molders and compounders, such as American Hard Rubber Co., New York, N.Y., have made up similar materials for their own use.

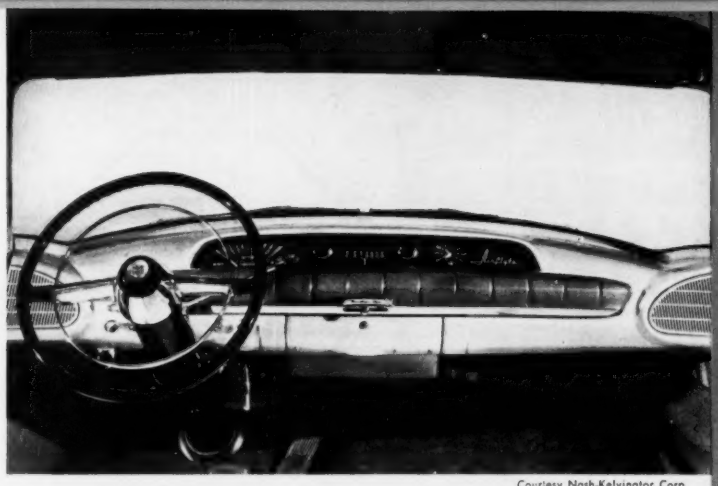
Bolta's copolymer sheet is Boltaron 6100. It comes in eleven standard thicknesses, from 0.015 in. to 0.500 in., and three types: a) solid color throughout, b) random core with specified face and back sheets, c) random back with specified face. Fourteen colors are available in each type, and surface may be mirror, matte, grain, or patterned. Sheet sizes are 32 by 62 in., and 35¾ by 72 in. Special formulations are available on request.

U. S. Rubber's copolymer sheet is Royalite. There are five formulations: 1) the standard 100 series; 2) the No. 180 special electrical stock; 3) the flame resistant FR-1100 series; 4) the 700 series which is leatherlike; and 5) the new 1500 series. This new 1500 Royalite is an admixture of polymers, principally styrene and butadiene. The new sheet product is suitable for television masks and other uses which do not require high impact. It can be molded, calendered, and press formed. It is available in sheets and in roll form, in standard thicknesses, and in grain and smooth finishes. It is being introduced in limited colors with more colors in the development stage. The 1500 series Royalite will be considerably less expensive than the 100 and 500 series.

Range of Finishes

In the older Royalite formulations, a range of fine grains from mirror to leather finish are available in both random core or back with specified face, and in solid color. Thicknesses go from 0.0312 to 0.500 inch. Eight colors are offered in the 100 series. Sheet sizes are 54 by 70 in. and 54 by 92 in., untrimmed.

Dow Chemical Co. is entering the



Courtesy Nash-Kelvinator Corp.

Fig. 3—Safety pad on Nash instrument panel is made of formed piece of styrene copolymer sheet over expanded modified vinyl pad

Courtesy Admiral Corp.

Fig. 4—An indication of possible future use of copolymer sheet material is this experimental refrigerator door liner, vacuum formed in one piece on a wooden mold

Courtesy Bolta Products Sales, Inc.

Fig. 3—Two patterns and colors of copolymer sheet are used in portable radio cabinet. Trim cuttings are used to mold the handle

field this month with a sheet version of its Styron 475 material. This low-cost copolymer sheet is available in white only at present, and in sheets 40 by 72 inches.

All these materials are high in impact resistance, some having tremendous impact strength, high abrasion resistance, terrific chemical resistance, and low water absorption. They may all be formed by heat and pressure, may be machined, sheared, sawed, sewed, punched, drilled, sanded, cemented, printed, and hot stamped. Specified heats used to soften the various thicknesses for forming will not alter grained or mirror finishes. In assembly of parts, screws or rivets may be used with no danger of fracture. Finished products may be cleaned and waxed, or polished.

The panel on page 72 lists some of the already accepted applications of the sheet copolymers and, in color, just a few of the many new applications now under development or projected.

One of the most spectacular jobs is the Royalite "safety crash pad" on the 1952 Nash Ambassador and Statesman models. This formed piece, shown in Fig. 2, rests over a pad of Ensolite expanded modified vinyl, and runs almost the full width of the instrument panel.

Figure 3 shows an Airline portable radio cabinet fabricated out of two patterns and colors of Boltaron by a fabricator in Connecticut. For

Courtesy T. O. Plastics Corp.

Fig. 5—Display unit formed of styrene copolymer sheet is an example of a piece with a double draw

Fig. 6—Despite depth of draw, multi-compartment assembly tray is formed from sheet which is only 1/2 in. longer and wider than the top surface of finished tray

Courtesy Bolta Products Sales, Inc.

Fig. 7—Traffic marker formed from copolymer sheet is shatter-proof, weather-resistant

a run of only 10,000 or 20,000, such as this, mold costs for injection molding would be prohibitive. The trim cuttings were reworked to mold the handle.

The refrigerator industry is a growing market for all plastics as components. In Fig. 4 is shown an experimental refrigerator door liner, vacuum formed on a wooden mold from Dow's Styron 475 sheet in the development department of Admiral Corp.'s MidWest Mfg. Corp. subsidiary at Galesburg, Ill.

One-Piece Displays

Merchandising and display accessories are a "natural" group of applications for sheet styrene copolymers. Figure 5 shows the "Mail Box" display unit made of gray Royalite by T. O. Plastics Corp., Minneapolis, Minn., for Treasure Masters Corp., of the same city. This display is made in one piece, with a deep groove formed in the back to hold the sign made also of printed Royalite. This represents a double draw —not at all unusual for these materials which, heated, may be stretched many times their original area without fracture.

Since light weight, extreme formability, great toughness, and cleanability of these materials are prime properties, it is natural that early

Courtesy Durable Formed Products, Inc.

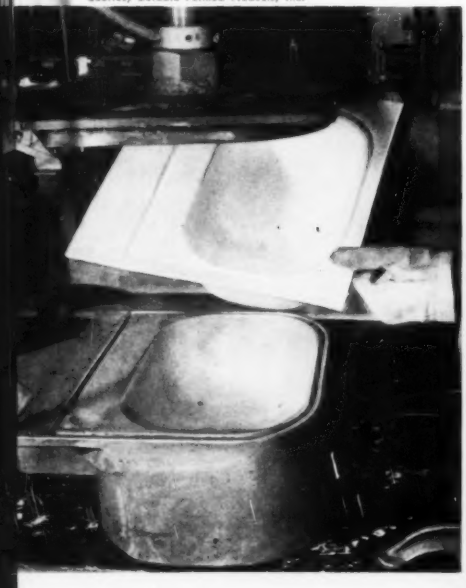


Fig. 10—Wash basins for use in airplanes, ships, or trailers are made by vacuum drawing styrene copolymer sheet into metal mold

Fig. 11—To overcome shrinkage, styrene copolymer sheet (behind operator) is clamped to stretcher frame during heating and forming

Courtesy United States Rubber Co.

Fig 8—Political novelty display formed from 0.015-in. thick styrene copolymer sheet, printed before forming

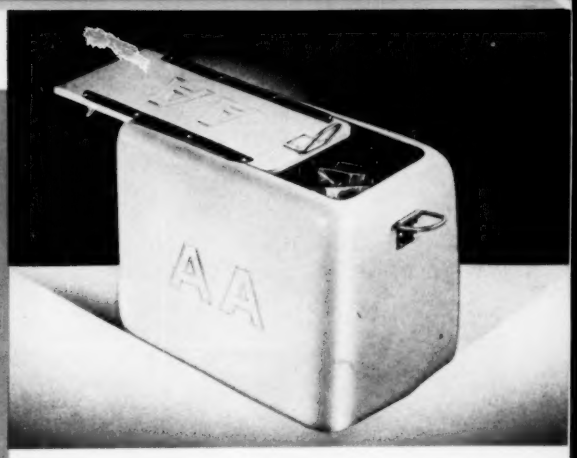


Fig 9—Ice container for use on airlines is vacuum molded in two halves and cemented. Note hardware riveted to the plastic

applications show up in tote boxes and trays. Figure 6 shows a large assembly tray formed out of Boltaron 6100 by Steiner Plastics Mfg. Co., Glen Cove, L.I., for Winchester Repeating Arms Co., New Haven, Conn. The original sheet in this case was only ½ in. larger and wider than the top of the finished tray.

The fact that the styrene copolymers can be decorated by painting and printing is leading them into other big new applications. The traffic marker shown in Fig. 7 is molded from Boltaron 6100 by Denver Plastics Inc., Denver, Col. The toughness of the material, the fact that it will not shatter when hit by stones or bullets, and its weather resistance, contributed to the selection of the sheet plastic. Forming was by vacuum mold operation, using a solid-color face material, with random back, and printing was done by a combination roller-coat and silk-screen process.

Another printed application of styrene copolymer sheet is shown in Fig. 8. In this case, the printing was done before forming from 0.015-in. Boltaron sheet, to make a durable low-cost political gag display.

Cementing properties of styrene copolymer sheets are shown by the application in Fig. 9. This is an ice container, vacuum molded from Royalite stock in two halves from one sheet in one mold, the halves then cemented together and buffed to a perfect finish. This example also shows the advantage of these materials when riveting of hardware is part of the design. The container is molded by Steiner Plastics for American Airlines.

After tote boxes, the first big proprietary application of styrene copolymer was in the trailer and airplane sinks and basins made by Durable Formed Products Inc., New York, N.Y. Pure white Royalite ¼ in. thick, vacuum drawn into a metal mold, was used in the sink, Fig. 10.

Shrinkage Factor

Fabricators who can handle one kind of thermoplastic sheet can soon

Fig. 12—Tray for electronic tube filaments formed in mold at left has a large number of uniform indentations. Note stretcher frame to prevent shrinkage

Courtesy United States Rubber Co.

Fig. 13—Tote box for rifle stocks involves deep draws. Pattern heating keeps wall from thinning out too much

Courtesy Bassons Industries Corp.

Fig. 14—First step in manual stretch forming of boat deck is to clamp hot sheet at one side of male form and pull it taut by hand

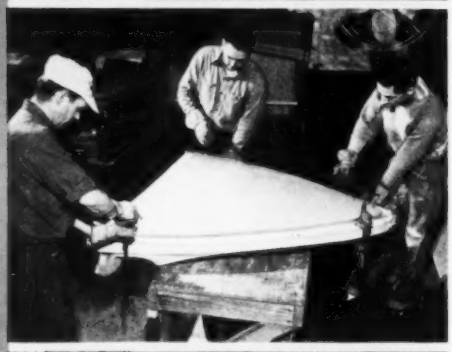


Fig. 15—After sheet has been pulled over form, it is held until cool by the clamping device, Fig. 1

Fig. 16—Operator holds completed boat deck. Others are visible already in place

Photos above courtesy United States Rubber Co.

learn to handle them all. Basic methods of forming all of the older ones were fully discussed in the "1950 Modern Plastics Encyclopedia." One big difference in handling the newer materials is that they are extruded or calendered, rather than cast, so they have shrinkage factors which must be overcome in the forming process. The old principle of "plastic memory" may cause a sheet of extruded or calendered material to shrink in length and thicken up when heated. So in literally every job of forming with these materials, strong clamps are used on the outside edges of the stock when it goes to the press, and often during the heating cycle, to overcome the shrink factor. Each material maker provides fabricators with specific shrink factors of each type of material offered.

An example of one type of stretching device is shown in Fig. 11. Behind the operator in the Pearson-Berlinghof Inc., Newtown, Pa., plant, is a sheet of Royalite on its stretcher being conveyed out of the vertical oven at rear. Held by the operator is the finished formed piece, which will become two tops of a fruit juice dispenser unit, made from one 23 in. by 27 in. piece of material. Another example from the same plant, shown in Fig. 12, is an electronic filament tray manufactured for Radio Corp. of America. In this case, a multiplicity of deep, uniform indentations are produced during the forming operation.

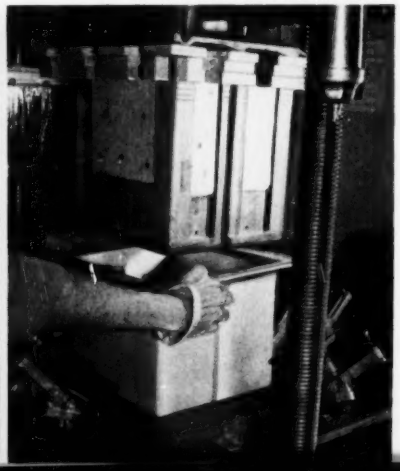
Another big difference between fabrication of cast sheet materials and extruded or calendered ver-

Fig. 17—Front cover for orange juicer is formed by blowing heated sheet against polished wood male mold. Clamping ring is hanging on lower air valve of press

Courtesy United States Rubber Co.

Fig. 18—Refrigerator liner 12 by 12 by 12 in. is formed from 14 by 14½ in. sheet. Male mold is wood

Courtesy Durable Formed Products, Inc.



All photos this page courtesy Auburn Button Works, Inc.

Fig. 19—"Mold" for a vacuum formed television mask is plaster form with tiny holes to permit removal of air

Fig. 20—Sheet used to form mask (shown here being placed over form) is white styrene copolymer material 0.060 in. thick

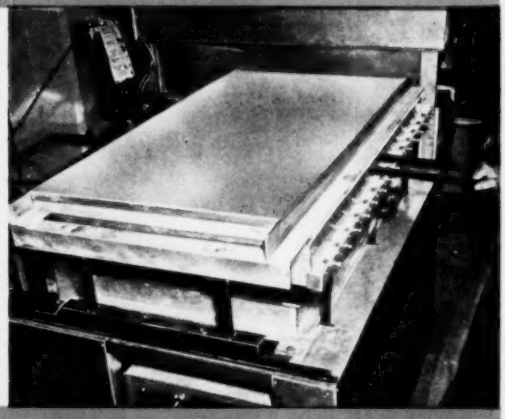
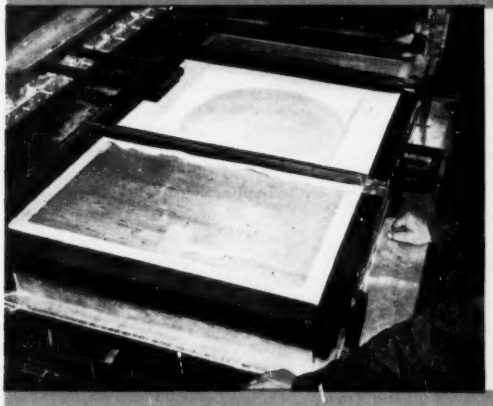


Fig. 21—After sheet is in position, clamping frame which is an integral part of machine is pulled into position over sheet

Fig. 22—Heater unit is then pulled forward over sheet material. Heater, only 1½ in. from plastic, may be as hot as 700° F.



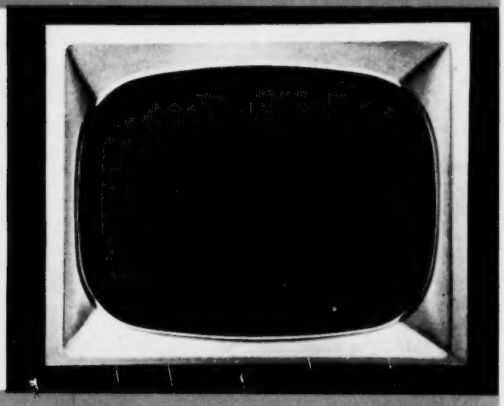


Fig. 23—After heating cycle, vacuum valve is opened and sheet snapped down against plaster form in fraction of second

Fig. 24—Finished styrene copolymer mask for 21-in. television. Sheet is trimmed after forming; mask is spray painted

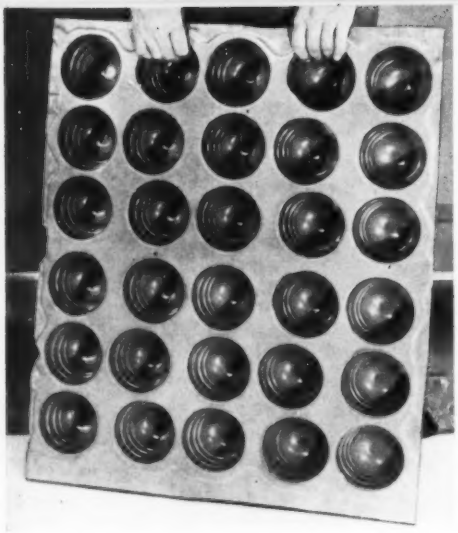


Fig. 25—Television tube backs formed from styrene copolymer sheet 30 at a time can compete with molded backs in cost and can be produced at higher speed

sions, is that the styrene copolymers are extremely tough and high in tensile strength, and may be drawn to extreme depths. This advantage can pay off only when accuracy is obtainable at every point in the finished formed piece. Special "pattern" heating methods have been devised by the use of baffles to keep certain parts of a sheet reasonably cool, and other parts quite hot, so that the hot parts will draw to thinner gage at points not requiring great stress.

Bassons Industries Corp., Bronx, N.Y., in molding the Royalite tote box shown in Fig. 13 for Winchester Repeating Arms Co., uses this pattern heating principle coupled with very fine mold design, based on the flow properties of the material. The hottest areas stretch more than the cooler sections, and thus thicker walls are found at corners and edges where the thinnest walls would otherwise be expected.

Vacuum or Pressure

While the rigid sheet thermoplastics may be formed by the use of male and female molds as in compression molding work, and by such simple methods as manual stretch forming, as shown in Figs. 14, 15, and 16, wherein the hot sheet is clamped at one side of a male form, pulled taut by hand over the rest of the form and held until cool by some clamping device, the chief method used is that of vacuum or air pressure forming. By use of air pressure, free bubbles may be blown by heating the material, clamping it in a ring, and forcing the air against it. For shapes, the sheet may be heated and clamped and then sucked into a female mold, or it may be blown by pressure up or down on top of a male mold, using the exactly opposite principle, as shown in Fig. 17, taken in the Pearson-Berlinghof plant. The polished wooden male mold is visible in the press, as are the clamping devices attached to the ring platen.

Where straight deep draw but simple form is required, and providing properly controlled heating is arranged for, ridge forming is sometimes used, the female mold being a ring and the male being just a skeleton. This method, because of the relieved nature of the male mold, can result in parts of more uniform thickness. An example is shown in Fig. 18. This refrigerator liner for Pabst Corp. is molded by Durable Formed Products, Inc., from $\frac{7}{32}$ in. thick Royalite. The original sheet size is 14 by 14½ in., and the finished refrigerator liner has inside dimensions of 12 by 12 by 12 inches. To get the draw, a vacuum box is used below the female.

The method to be used is determined by such things as the material being formed, the size and shape of the piece to be made, the target price of the piece, and whether the finish is to be perfect on both sides of the piece, on the inside only, or on the outside only.

A common problem in vacuum forming is that of keeping the material properly heated until the pressure is applied. Old-line acrylic fabricators, such as Steiner Plastics, have established a policy of taking the press to the oven, and in arranging plant layout make sure that there is an oven within a distance of 4 ft. from each of four presses. Other companies, such as Bassons, have mechanized the transfer of material from oven to vacuum press.

Until very recently (see MODERN PLASTICS, *28*, Sept. 1950, p. 105, "Printed Sheets Precision Formed"), there were no standard presses made to do the combination job of sheet heating and vacuum forming.

Standard Vacuum Equipment

But with the introduction of the Sill press, developed in collaboration with E. Bowman Stratton, Jr., when he was doing map development for the U.S. Navy, the vacuum forming press now becomes available as standard equipment to a much wider group of fabricators.

The Sill machine can be used for sheets up to 0.125 in. thick, and the largest unit built so far handles a 40 by 60 in. sheet, and is capable of a 12 in. draw. While the sheets are heated only from one side by the radiant heating element, that heat is controlled to a degree not possible with ovens.

Figures 19, 20, 21, 22, and 23 show the Sill machine at work in the plant of Auburn Button Works, Inc., Auburn, N.Y., vacuum forming a mask for a 21 in. television tube, out of Styron 475 sheet 0.060 in. thick. Figure 24 shows the finished mask.

In use, the sheet material is clamped in place, and the radiant heating element is brought over the sheet, the heater being only 1½ in. from the surface. The amount of heat to be applied depends on the type of material, its thickness, and the depth of draw expected. After the heating cycle, the vacuum valve is opened and the sheet is snapped down against the die in a fraction of a second. The vacuum draw is so fast that the sheet is formed in much less than one second. Sill makes two machines, one manually controlled, in which the operator must start the vacuum, and the other in which the vacuum is automatically pulled at the end of the heating cycle.

As with custom-built machines,

(*Continued on p. 183*)

Hyatt Award

THE eleventh annual John Wesley Hyatt Award "for achievement of wide importance to the plastics industry" was presented to Palmer W. Griffith, West Coast technical sales director of American Cyanamid Co., on June 5 at the award banquet at the Hotel Pierre in New York City. The Honorable Dan A. Kimball, Secretary of the Navy, delivered the principal address at the ceremonies.

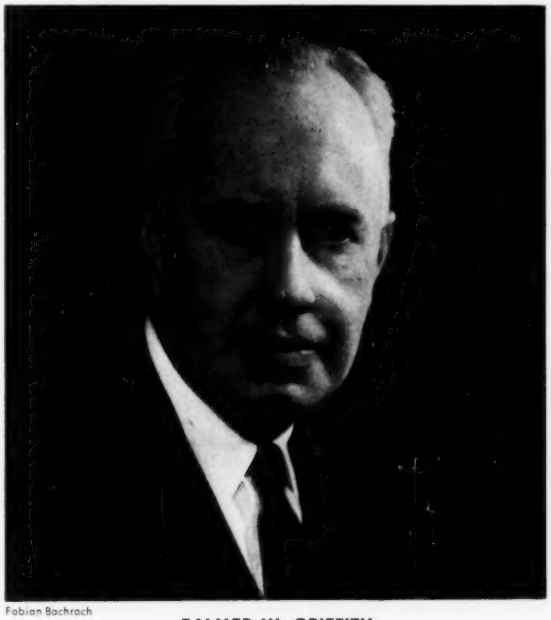
A distinguished group of leaders in the fields of plastics, chemistry, manufacturing, and finance, witnessed the presentation by Gordon Brown, president, Society of the Plastics Industries, to Mr. Griffith for his work on the development of melamine resins. The award consists of a gold medal and $1000.

Mr. Griffith was cited for his researches which were instrumental in bringing melamine from a laboratory curiosity to a plastic which has become the basis of a new industry.

Many years ago in the course of an investigation of possible derivatives of cyanamide, he produced dicyandiamide, and observed that it contained an impurity which he identified as melamine.

Later, in 1933, while seeking ways to improve urea-formaldehyde resins, Mr. Griffith recalled the melamine he had found in dicyandiamide. Adding some melamine to formaldehyde, Mr. Griffith heated the product on a watch glass, and found that a resin could be made. He then repeated his experiment, but this time he added paper pulp, dried and ground the resulting product, and produced the first melamine-formaldehyde molding compound. He molded it in a pin-tray mold and found that all trays molded perfectly. Tests in boiling water showed that gain in moisture content was around 0.5%, whereas urea-molding compounds gained up to 3.0 percent.

Cyanamid started producing melamine in 1934 on a small scale; by 1937, on a full-scale basis. The first commercial alpha cellulose molding compounds were introduced in 1939.



Fabian Bachrach

PALMER W. GRIFFITH

The 1951 John Wesley Hyatt Award winner has devoted his entire career to the development and sale of plastics. He joined American Cyanamid Co. in 1922, shortly after earning an M.S. degree at Massachusetts Institute of Technology. For the next 13 years, Mr. Griffith engaged in plastics research at the company's laboratories at Warners, N. J. His work during these years culminated in the development of melamine-formaldehyde resins and molding compounds.

In 1935, Mr. Griffith was transferred to sales engineering and technical service activities. He moved to the company's Los Angeles, Calif., [illegible] in 1943 to take charge of technical service on the West Coast, and the present time resides in San Gabriel, Calif.

Throughout the war years, Mr. Griffith served in an advisory capacity on the development of melamine resin and glass cloth mounting boards, and on other wartime applications of melamine.

A native of Arlington, Vt., Mr. Griffith received his early education at Vermont Academy, in Saxtons River. He graduated from Dartmouth College in 1919 with an A. B. degree. In 1921 he received a B.S. degree from Massachusetts Institute of Technology, and a year later, the M.S. degree. He is a member of the Society of the Plastics Industry.

The committee for the eleventh annual John Wesley Hyatt Award consists of Richard F. Bach, consultant in industrial arts, Metropolitan Museum of Art; James Bailey, 1950 medalist; Edgar C. Britton, president, American Chemical Society; Gordon Brown, president, Society of the Plastics Industry, Inc.; Waldemar Kaempffert, science editor, *New York Times;* George Braxton Pegram, vice president emeritus, Columbia University; Dr. Edward R. Weidlein, director, Mellon Institute of Industrial Research. William T. Cruse, executive vice president of the Society of the Plastics Industry, is secretary of the committee.

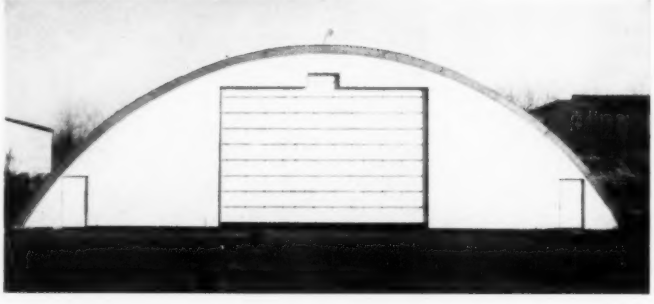
The patron of the award is Hercules Powder Co.

ALERT SHELTER

Shelter door assembly is panelled with reinforced plastics and consists of main door that rolls overhead, two wing doors that fold upwards, two tip doors that fold back

All photos courtesy East Coast Aeronautics, Inc.

Even with the shelter completely closed (as below), light weight of polyester fiber glass panelling enables doors to be opened and plane put into the air in 90 seconds



FORERUNNERS in the application of reinforced plastics in the construction field are the jet plane alert shelters built by Plastics Div., East Coast Aeronautics, Inc., Mt. Vernon, N.Y., under an experimental United States Air Force contract.

The shelters, designed for use especially in Arctic areas, have now had several months of service, and are functioning most satisfactorily. Each shelter is 72 ft. wide, 64 ft. long, and 24 ft. high, and is built of eight magnesium arches and many fibrous glass-polyester plastic panels, plus fasteners and specially adapted door hardware. Each arch is composed of four interlocking segments, with the outside ends footed on small concrete piers.

Tools for fastening the magnesium members together, and for fastening the plastics panels to the magnesium arches, are very simple. The whole shelter is as easy to put together as the standardized parts of a child's construction toy.

All the longitudinal strength in the structure is in the plastics panels, which are 4 ft. by 8 ft. each, "pan" in design, and strengthened by two beams and four cross-ribs molded into each. Under the development contract, the panels were vacuum molded using a polyvinyl acetate blanket; but on mass production runs they could be easily press-molded without the use of the ribs. According to East Coast Aeronautics, metal-to-metal press molding of the panel elements would immensely simplify the manufacturing operations; also, by this method molding speeds could be obtained equivalent to the speeds normally obtained in plywood production.

Insulation Built In

Insulation of the panels is simple. It is provided by taking bats of aircraft-type glass wool insulation, laying over each bat a sheet of vinyl-impregnated and coated cotton fabric, gluing the sheet to the top of the bat, turning the ends of the fabric under the bat, and then cementing the vapor-protected bats to the indented areas in the panels between ribs and beams. The insulation and the vinyl-coated fabric moisture barrier were provided by Gustin-Bacon Mfg. Co., Kansas City, Mo. Each panel, insulated, weighs 45 lb., and the insulation is so strong in compression strength that it may be walked on without damage.

The front door of the shelter is 24

FOR JET PLANES

Speed of construction, light weight, and high strength characterize new large shelters made with panels of reinforced plastics

ft. long, and is made up of panels 3 ft. by 8 ft. in size. Outside of this main door, which rolls overhead, are two wing doors which fold upwards, and two triangular tip doors which fold back. At the rear of the shelter is another upward-folding door to permit the blast from the jet engines to be dissipated into the air when the plane starts its engines while still in the hangar.

Design Advantages

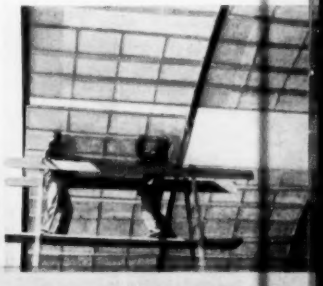
The first advantage of the design and construction of this alert shelter, and of the use of reinforced plastics in it, is that the panels and the magnesium arch sections stack and both are light enough in weight for shipment by air. The second advantage comes in the speed with which the building can be fully assembled. A four-man crew can do the job in two days, and it can be slapped right down on the end of any airport runway. The third advantage is, of course, in the speed with which the light-weight doors operate. From the moment of alert warning, with the shelter completely closed, and at any temperatures from tropical to sub-zero, the plane's engines can be started, all necessary doors opened, and the plane run out of the hanger and in the air within a space of 90 seconds.

Engineering on the job was directed by Louis Linzmeyer of East Coast Aeronautics.

With the construction industry becoming daily more cognizant of the possibilities of plastics in building, with the strength-weight ratios of building materials a major factor in construction engineering, with factory production of large building components almost a permanent objective, this jet aircraft shelter is naturally due to receive much attention from architects and building engineers.

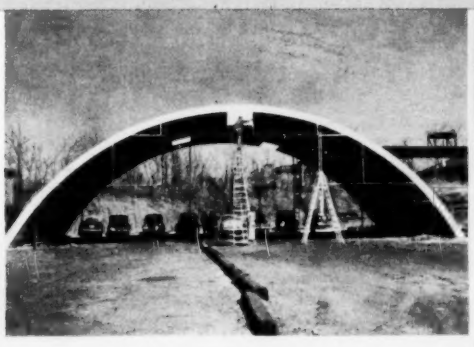
Typical set-up of magnesium arch with the plastic panels laid in

Magnesium arches, which are footed to small concrete piers, serve as framework for shelter; panels are then attached to the arches



Plastic panels being fastened in place between the arches from the underside

Door assembly is positioned for the insertion of reinforced plastic panels



Initial framework indicates location of the five front doors; shelter's size is evident from automobiles lined up at the rear

Vapor-protected bats cemented to the panels provides insulation

Better Plywood

PHENOLIC surfaces, applied during manufacture, give Douglas fir plywood new surface characteristics which are resulting in increasingly large numbers of applications. The plastic surfaces are abrasion resistant, hard, resistant to water absorption and chemical action, easy to clean, and stand up successfully under out-of-door weathering conditions. Some of the fields in which plastic surfaced plywood is being used include reusable concrete forms, exterior siding for buildings, interior cabinets and furniture, freezer lockers and store fixtures, table tops and other work surfaces, wainscoting, highway signs, displays, boats, and anti-slip flooring.

Plastic surfaced plywood is produced in several grades, the base being selected fir veneers laid up with waterproof phenolic adhesive. The surface itself consists of layers of phenolic impregnated paper (48 to 52% of resin by weight) or a mixture of resin and wood fiber. In some types, the impregnated sheet is opaque, hiding the grain of the wood; this type is generally known as painting grade. In another type, the plastic overlay is a high density resin impregnated fiber sheet which processes to a translucent surface, allowing the grain pattern of the wood to show through. This type may be painted, but is usually used as-produced to take advantage of the decorative appearance of the wood grain.

The special flooring grade has a grid-like surface which is produced by using a wire screen mesh in the pressing process so as to leave the impression of the mesh on the plastic surface.

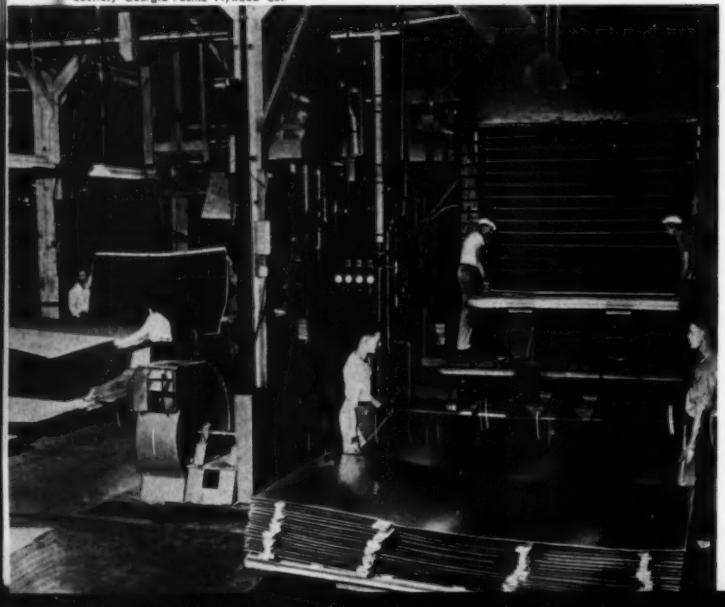
Plastic surfaced plywood is now being manufactured by Georgia-Pacific Plywood & Lumber Co., Olympia, Wash.; Harbor Plywood, Aberdeen, Wash.; St. Paul & Tacoma Lumber Co., Tacoma, Wash.; and Anacortes Veneer, Inc., Anacortes, Washington.

Method of Production

In the production of the plywood, three to ten sheets of Kimberly-Clarks' Kimpreg or similar impregnated paper are laid up in "sandwiches" with carefully selected and processed B grade or better fir veneers spread with waterproof-type phenolic adhesive. Pressing temperatures and pressures used depend upon the thickness of the panels. Temperatures range from 260 to 300° F. and pressures from 150 to 200 p.s.i.

Plastic-surfaced plywood is produced by laying up sheets of impregnated paper and fir veneers spread with phenolic adhesive and pressing them under heat and pressure

Courtesy Georgia-Pacific Plywood Co.



Concrete Forms

The major use for plastic surfaced plywood has been in concrete forms. Its smooth surface produces a smoother concrete surface and thereby decreases finishing costs as much as 60 percent. Another advantage is its resistance to the wet abrasion which is the chief cause of the failure of ordinary plywood forms. As a result, plastic surfaced plywood forms can be reused two to three times as often as ordinary plywood forms.

Many decorative applications have been found for plastic-surfaced plywood with a translucent surface. For example, it was used in the fixtures in the lamp showroom in an accompanying photograph. This same type has also been successfully used for exterior siding and gives a house the natural wood look so often desired in modern houses. Where the appearance of the natural grain is not wanted, painting grade plastic-surfaced plywood can be used for the same purpose.

Foundry Matchboards

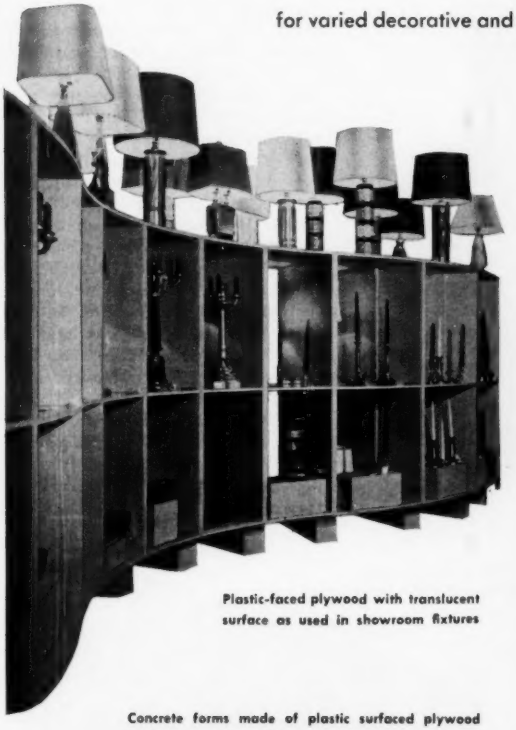
One industrial application for plastic-surfaced plywood is in foundry matchboards. Cooper Alloy Foundry Co., Hillside, N.J., used to mount its patterns on lumber boards which cost about $15 or on aluminum matchboards which cost between $15 and $20 for a two-foot matchboard. Now the company is using plastic-surfaced plywood matchboards which cost only $2.40 each and have a longer service life because they are unaffected by hot damp sand.

Surfaces

Abrasion-resistant,

moisture-resistant phenolic-impregnated paper surfaces fit plywood

for varied decorative and industrial uses



Plastic-faced plywood with translucent surface as used in showroom fixtures

Courtesy Georgia-Pacific Plywood Co.

Plastic-faced plywood matchboard costs 85% less than one of lumber

Courtesy Kimberly-Clark Corp.

Surfaced plywood for siding in residential construction can be painted or left unfinished for modern, natural-grain appearance

Concrete forms made of plastic surfaced plywood produce smoother finishes on concrete, at lower cost

Courtesy Douglas Fir Plywood Association

Courtesy Kimberly-Clark Corp.

Work surfaces of plastic faced plywood, such as this paper sorting table in a paper mill, are abrasion resistant and easy to clean

Jacquard Weaves

Photos this page courtesy Firestone Plastics Co.

Sofa is upholstered with woven saran fabric which combines the texture and appearance of conventional materials with the wearing qualities of plastic. Pattern (right) is called Bristol

WOVEN saran fabric, previously available only in solid colors, plaids, stripes, and checks, is now being made in a wide range of new patterns including florals, abstracts, and geometrics. The new patterns were made possible by the development of techniques for weaving saran on Jacquard looms.

In Dobby looms, the only kind previously used to weave saran, the threads are controlled in "harnesses" or groups and each thread can be made to do only what the others in its group are doing. Thus, the resultant patterns are fairly regular. In Jacquard looms, on the other hand, each thread is individually controlled and the range of patterns is virtually unlimited.

For some time, the wiry quality of saran as compared with conventional threads—plus the static it generated—prevented its use on Jacquard looms. But these problems

Comet pattern (left) consists of simple floral enclosed in geometrical figure

Abstract pattern which suggests birds in flight (above) is called Buffalo

Birmingham pattern is a repetition of wavy ovals enclosed by wedges (right)

in Saran

have been overcome and it can now be woven as easily as conventional materials.

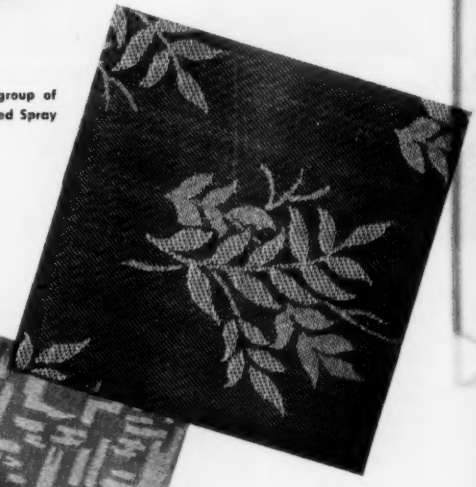
Some of the many Jacquard weaves now in production are shown on these pages. Those on the left hand page were woven with Velon monofilament extruded by Firestone Plastics Co., Pottstown, Pa. Three of the patterns shown (Bristol, Buffalo, and Birmingham) were woven by Swift Mfg. Co., Columbus, Ga. The fourth, Comet, was woven by Wortendyke Mfg. Co., Richmond, Va. The sofa at the top of the page, covered with Swift's Bristol pattern, is made by Artcraft Mfg. Co., Atlanta, Ga.

The patterns on the right hand page are woven by Bolta-Saran, Inc., Lawrence, Mass., which also extrudes the saran monofilaments.

In patterns such as these, woven saran will undoubtedly find wider acceptance as upholstery material.

All photos on this page courtesy Bolta-Saran, Inc.

Sofa with vinyl sides and front panel has seat and back covered with woven saran in new Leaves pattern (left)

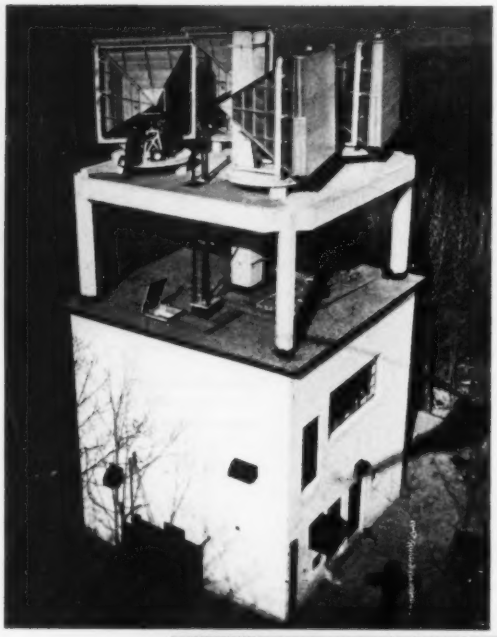


Pattern suggesting a group of branches (right) is called Spray

Pattern made up of spray of feathers (above), appropriately named Plume

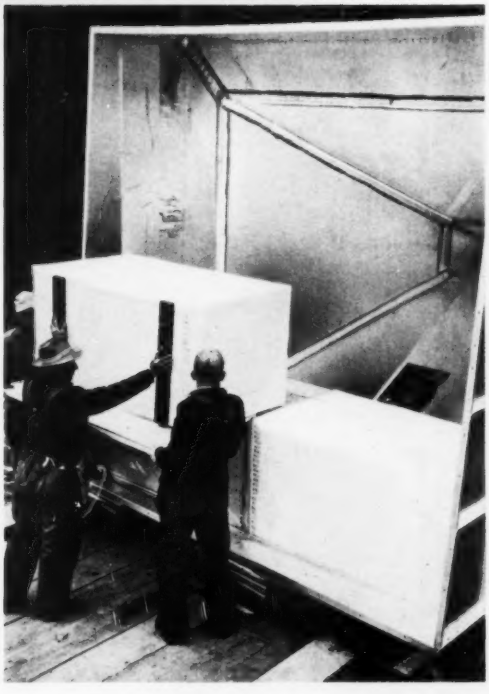
Keyes pattern (left), a geometric, was one of first woven on Jacquard loom

Styrene Foam in Radio Relay



Light in weight and having good insulating properties, styrene foam is used in the lenses of microwave antennas located atop relay towers in high-frequency transmission system

Photos courtesy Bell Telephone Labs.



Assembling expanded styrene blocks containing the metallic parts of the lens of a microwave antenna. The slabs which go to form the blocks are bonded with acrylic cement

STYRENE foam, which has won wide acceptance in the display field and has also been successfully used as a flotation agent in small boats, plays an important part in the new relay towers being built by the Bell Telephone System to pick up and transmit high-frequency telephone and television signals for long distances.

The high-frequency signals, or microwaves, used in this system act somewhat like light, in that they travel in a straight line and can be focused and sent out on a narrow beam by means of a suitably constructed lens. It is in these highly technical "delay lens antennas," which may be seen on top of each relay tower, that large quantities of Dow's Styrofoam are used.

The lenses, developed by Bell Telephone Laboratories, are composed of metal strips set into blocks of the foamed plastic material. They fit into the large end of the antenna housing, which resembles the speakers used on the old-fashioned gramophone. Capable of focusing the high-frequency impulses used in the relay system, the lenses also act as antennas for either transmission or reception.

In building the lenses, the metal strips are sandwiched horizontally into blocks of the foamed plastic material which have been slotted to a depth equal to the width of the strips. Slabs of Styrofoam which form the blocks are bonded with Rhoplex WC-9. Each lens of this type, when completed, measures 10-ft. square by approximately 3-ft. thick and contains 500 lb. of the plastic foam in the form of some 2000 "boards."

Selection of styrene foam for these lenses was based upon its light weight and excellent insulating properties. The material makes it possible to arrange the lens elements in the desired "lattice" pattern in space, producing a lightweight structure. Styrofoam used for this purpose must be of uniform quality throughout and pass rigid specifications. Since some of the towers are located in desert regions, the foam material must withstand high temperatures.

NEWS AND VIEWS OF PLASTICS PROGRESS

STOKES plastics review

VOL. 1
NO. 4
1952

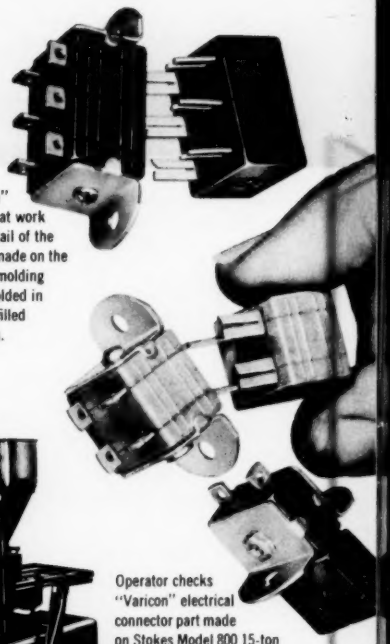
PUBLISHED BY F. J. STOKES MACHINE COMPANY, PHILADELPHIA 20, PA.

Varicon Connectors Made by Elco Corp. on New Model 800 Plastics Molding Press

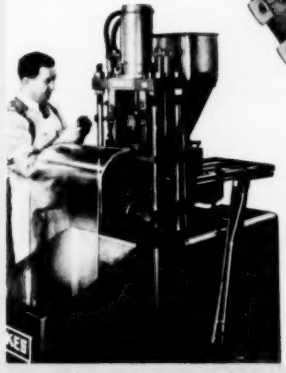
One of the first production models of the new Stokes Model 800 fully automatic plastics molding presses has been installed at Elco Corporation, Philadelphia, Pa., for molding miniature "Varicon" electrical connectors. Founded in 1947 to manufacture tube sockets and shields, Elco Corporation recently began making this new type of electrical connector which provides a positive means for connecting electrical assemblies or sub-assemblies to each other.

The "Varicon" connector components consist of the following basic parts: molded phenolic end sections precisely made to critical tolerances; brass, phosphor bronze or beryllium-copper contacts; and a molded phenolic center section which dovetails perfectly with other center sections as well as with end sections. The connector sections may be used in any needed multiple to obtain a desired combination of electrical contacts. Individual "Varicon" connectors may be assembled in multiple to provide any number of variations in polarity arrangement.

Elco "Varicon" connectors have a current rating of 30 amps and a rated voltage of 1330 volts (tolerate 4000 volts between closest terminals).



Closeup of Elco "Varicon" miniature connectors that work like giants, showing detail of the precisely formed parts made on the new Stokes Model 800 molding press. The parts are molded in general-purpose, mica-filled phenolic or alkyd resins.



Operator checks "Varicon" electrical connector part made on Stokes Model 800 15-ton fully automatic press at Elco Corporation. The new press operates on a 5-second press cycle, and molds all thermosetting materials, including alkyds without press modification.

Records for the Blind are Made on Stokes Molding Press

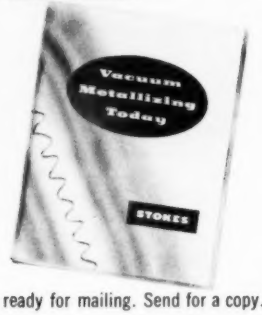
Known as Talking Books, special long-playing phonograph records are made today for the entertainment and education of the blind. The records are made on a Stokes 150-ton plastics molding press at the New York studios of the American Foundation for the Blind.

Twelve inches in diameter, the records are made of a thin, semiflexible material. Each one has the title and page number marked in braille. A printed book of average length can be recorded on 18 double-faced Talking Book records, a reading time of about nine hours.

Talking Books are distributed through the Library of Congress to 25 regional libraries for the blind, where they are lent, without charge, to blind borrowers. About 100 copies of 1600 titles are now available.

Talking Book records being made on Stokes molding press.

Illustration shows 48-inch production model, No. 426, one of three models of the Stokes Vacuum Metallizer.



It's new and ready for mailing. Send for a copy.

Latest News on Vacuum Metallizing...Fastest Growing Plastics Process

Costume jewelry, automobile parts, Christmas tree decorations, "printed" circuits, toy pistols and non-reflective glass are among the products commonly metallized under vacuum, and progressive manufacturers are finding, or experimenting with, many new uses for this fast, clean, economical process.

In this equipment metal or metal salts are deposited as metallic ions on the surface of plastic, metal, paper, cloth, leather or other materials. Low-cost materials are coated with a brilliant metallic finish in a wide range of colors. Cost is extremely low as compared with chemical reduction or electroplating. Non-conductors, which cannot be electroplated, are handled with complete success.

A new catalog describes many uses for vacuum metallizing. Pictures, drawings, and all specifications are given for three models of Stokes Vacuum Metallizer. Write for Catalog No. 725.

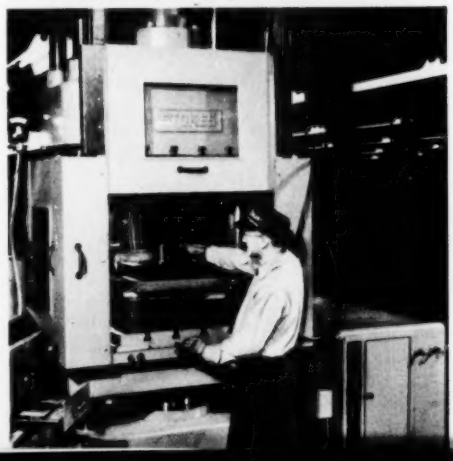
Allen-Bradley Molds Crossbars on New Stokes Transfer Molding Press

A new addition to the growing number of Stokes plastics molding presses at Allen-Bradley Co., Milwaukee, Wisconsin, is a semi-automatic transfer molding press, Model 727, for producing the components for a 300-amp starter and starting switch crossbar containing steel inserts.

A high-speed hydraulic press, Model 727 has an extra-long transfer stroke, permitting complete withdrawal of the plunger from the loading area to give ample clearance for loading preforms. The Allen-Bradley crossbar part has many thick sections, requiring preheated preforms to reduce the molding cycle; all steel inserts must be accurately molded in place during the curing cycle. The new Stokes press is proving ideal for this complex molding job.

Parts molded on Model 727 are of high density and uniformity; pieces with projections and small pins are easily produced. A three-speed controlled closing shortens the molding cycle, yet final compression is slow enough to eliminate potential mold damage. The press is designed to accommodate top as well as bottom transfer molding.

One of the 300-amp crossbars with steel inserts molded semi-automatically on Stokes Model 727 transfer molding press at Allen-Bradley Company, Milwaukee, Wisconsin.



Fast-Growing New Jersey Firm Uses Stokes-Windsor Extruders in Making Rigid Plastic Pipe

Viplax Corporation of Beverly, New Jersey, started from the ground up making shoe soles . . . in 1946. Another of their products is de-salting bags of vinyl sheet for the Navy.

Viplax' principal business now is industrial plastic pipe of both polyethylene and Boltaron 6200 series, a rigid nonplasticized polyvinyl chloride. Plastic pipe has many advantages over metals, particularly for the chemical industry. In addition to its low cost and light weight it affords the opportunity to conserve metals. It is impervious to attack by most acids, caustics and other corrosives. Moreover, it is easily formed at temperatures as low as 200° F.

The Stokes-Windsor installation in the Viplax plant includes an interesting mechanism for cutting rigid PVC pipe to length. A switch is set at the length desired for the pipe. When sufficient pipe has been extruded it trips the switch which actuates a clamp and sets a cut-off saw in position. After this cuts the pipe it returns to its original position until a new length of pipe again trips the switch.

Viplax is making pipe of ½" to 6" diameter. The Boltaron 6200 pipe is distributed through H. N. Hartwell Company of Boston. Viplax is one of several companies processing the Boltaron 6200 material.

Pipe . . . not a pipe-dream! Boltaron 6200 series corrosion-resistant pipe shown in the plant of Industrial Plastic Fabricators at Norwood, Mass.

Model RC-100 Stokes-Windsor extruder producing 2-inch Boltaron 6200 series rigid pipe in the Viplax plant at Beverly, New Jersey.

Have you read these . . . Six Brochures on Plastics Molding?

Model 800 (Bulletin No. 513): Describes the new Stokes 15-ton fully automatic plastics molding press which handles all thermosetting plastics, including alkyds without press modification.

Model 726 (Bulletin No. 511): Describes the new compression molding press available in either 100- or 200-ton size which is adapted for a wide range of molding, including deep draw work on large pieces. This model is convertible in the field to transfer molding.

Plastics Molding Presses (Catalog No. 512): Describes the full line of Stokes plastics molding presses, both automatic and semi-automatic, closure presses, and preform presses. Gives detailed data and specifications.

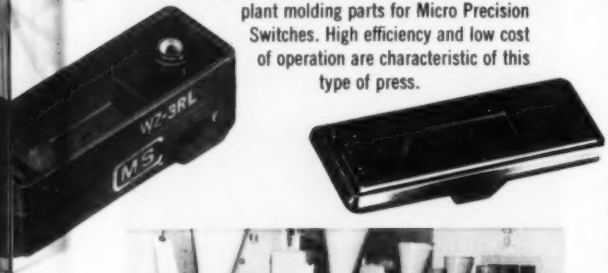
Plastics Preforming (Catalog No. 509): Describes the application and molding of preforms, characteristics of materials, methods of preforming, and punches and dies used. Details of Stokes preforming presses are also included.

Fully Automatic Molding: Describes the origins and growth, the uses and advantages of automatic plastics molding. Automatic molding is compared with other types of molding. Numerous examples are given of types of pieces now being made by fully automatic molding. Particular attention is given to cost savings.

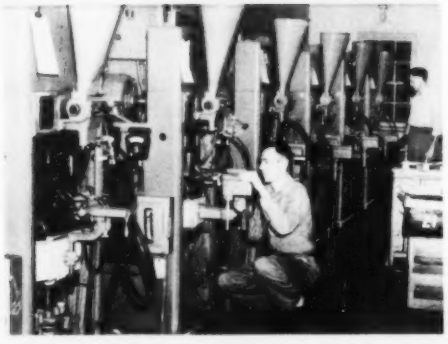
Closure Presses (Bulletin No. 504): Describes equipment for producing plastic caps and closures of any size or shape, with internal or external threads, in large quantities at low operating cost.

Copies of the above literature will be sent, free of charge, on request.

MICRO SWITCHES Control Stokes Presses Making MICRO SWITCHES!



Stokes 200D-3 presses in use at the Micro Switch plant molding parts for Micro Precision Switches. High efficiency and low cost of operation are characteristic of this type of press.



A battery of Stokes plastics molding presses is in use at the Micro Switch plant in Freeport, Illinois, for making Micro Snap-Action Switches.

Thirteen Stokes Model 200D-3 presses virtually "shift for themselves", as their entire operating cycles are automatically controlled. One man handles four machines molding precision covers, plungers and other parts for Micro Switches.

Seventeen of these Micro precision switches are standard equipment in each Stokes press used at the Micro Switch plant. Four of the switches control the up-and-down travel of the ram, protecting valuable molds and parts from costly damage. Eight switches control operations of the molding cycle. Other switches control cure, press closing, and ejection.

Micro Snap-Action Switches are enclosed within a precisely molded plastic case. Parts within the case are made with extreme precision so as to fit perfectly in the small space available. Distortion of the molded components must be entirely eliminated. All precision requirements are fulfilled through controlled automatic molding on Stokes plastics molding presses.

STOKES

F. J. STOKES MACHINE COMPANY
5534 TABOR ROAD, PHILADELPHIA 20, PA.

STOKES MAKES Plastics Molding Presses / Industrial Tabletting and Powder Metal Presses / Pharmaceutical Equipment / Vacuum Equipment / High Vacuum Pumps and Gages / Special Machinery

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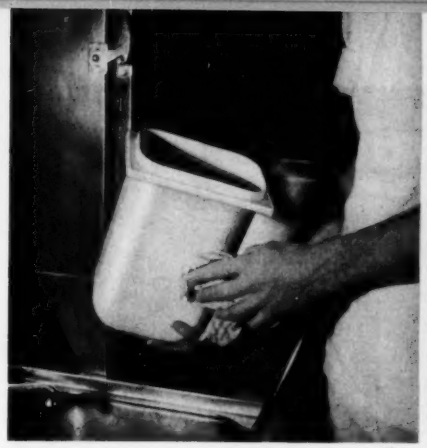
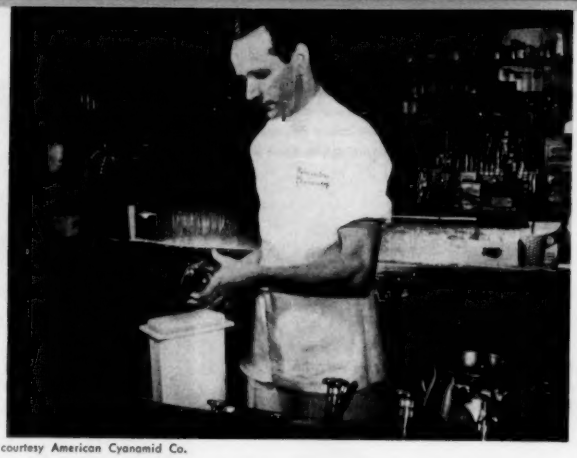




Photos courtesy American Cyanamid Co.

Rounded corners, lack of undercuts, and smooth sides of melamine syrup jar promote efficiency and speed in cleaning

Advantageous to the usually hurried operations of a soda fountain is the ease of handling and high break-resistance of the light-weight syrup jar

Fountain Jars of Melamine replace porcelain and stainless steel with advantages in sanitation, weight, and economy in handling

IF THERE is one denominator common to the soda fountains in the approximately 45,000 drug stores, in variety chains, and in other locations in the United States it is this: the people who work there work at high speed. So equipment for soda fountains has to be designed and made to be easily cleaned, easily handled, and able to take some punishment.

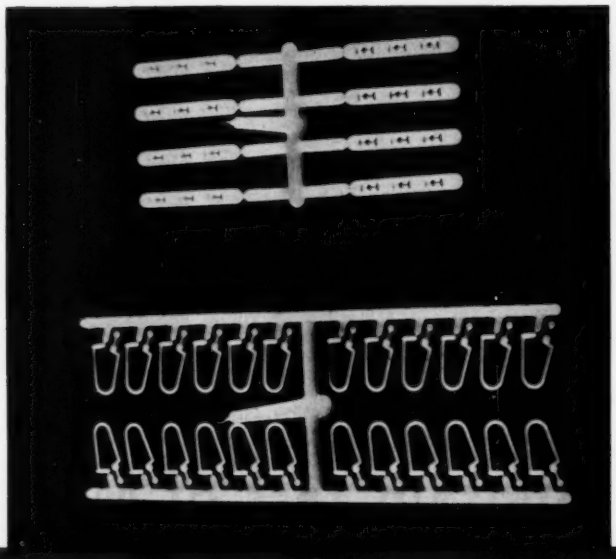
One of the largest manufacturers of sanitary-approved soda fountain equipment, Kenco Products Corp., New York, N.Y., having for several years observed tremendously increased interest in the use of melamine laminates and melamine tableware in soda fountains, has recently introduced a line of melamine "Kencoware" syrup jars and other containers for use with the company's standard soda fountain equipment. The new jars, molded of Melmac 1077 alphacellulose-filled material, replace jars made of either porcelain or stainless steel. The chief disadvantages of porcelain were its tendency to chip, the inaccuracy of its molding, and its heavy weight. The main disadvantages of stainless steel were its high price, its frequent lack of availability, its weight, and the presence of hard-to-clean areas under the flange.

Where a porcelain jar would

(*Continued on p. 184*)

Porcelain syrup jar (above, left) weighs up to 8 lb., is apt to chip; 4 lb. stainless steel jar (above, right) is high-priced, frequently unavailable, difficult to clean; melamine jar (right), weighing 1.8 lb., insures economy and can be put in automatic dishwashers

Nylon hook retainers are molded in 8-cavity die with all necessary holes and slots molded-in. Key hooks are molded 24 at a time and are molded in open position



Exterior of key case is 20-gage vinyl with either metallic or calf-grain finish; lining is vinyl embossed with a satin texture

Molded Nylon Holds the Keys

THE strength, flexibility, and resiliency of molded nylon are ingeniously utilized in the Orleans Key-Tainer, a new vinyl key case which has key hooks and hook retainers made of nylon instead of metal.

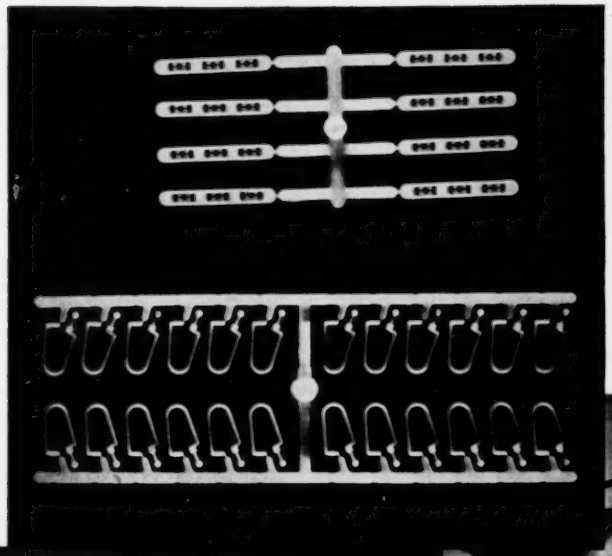
The metal hooks which have been used in key cases of this type for some time have a number of disadvantages. They are heavy; the metal-against-metal contact makes them noisy; and the rigidity of the metal necessitates moving parts in the hook retainer device. To find a replacement for metal, Buxton, Inc., Springfield, Mass., manufacturer of the Key-Tainer, enlisted the aid of American Optical Co., Southbridge, Mass.

Reasons for Nylon

Nylon was chosen for the key hook and hook retainer because it can be molded in thin sections and still have the desired strength. It can also be molded to close tolerances and has sufficient resiliency to make ball-and-socket snap fits possible. The possibility of obtaining the nylon in colors to match the vinyl case was also an advantage.

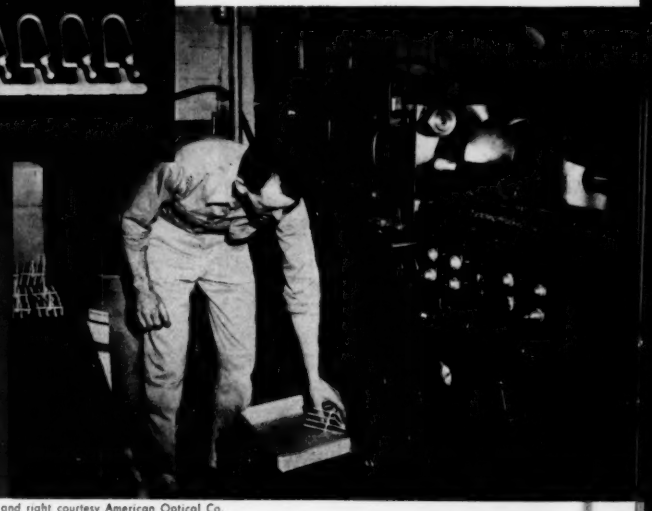
After the choice of the material had been made, the exact design of the parts became a problem. A number of experimental single-cavity molds were made and various pieces were tested. The final design chosen for the hook has a ball at the long end and a closed loop at the short end. The hook is closed by bending the long end and putting the ball through the loop. The hook has a wall section of about 1/16 inch.

The hook is attached to the hook retainer by snapping the ball on the end of the hook through one of three molded-in holes and then sliding the hook sideways through a short connecting slot to a U-shaped slot wider than the stem of the hook but narrower than the ball. In this slot, the hook can be moved up or down



Under side of shots shown on opposite page. Deep holes in under side of hook retainer result in variations in wall section of part. Note pin-point gates in hook shot

Nylon parts are molded on small injection machine and shot (shown being removed) is automatically ejected from the mold



Strong, resilient molded nylon hooks snap-fit into nylon retainer self-riveted to case made of vinyl sheet

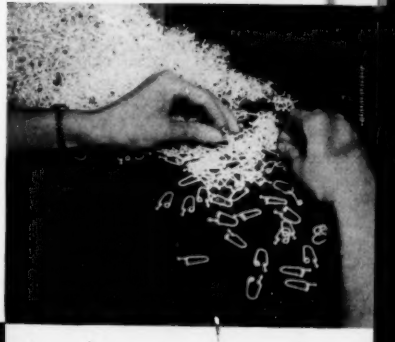
Photos above and right courtesy American Optical Co.

easily and swivels freely—but cannot come out.

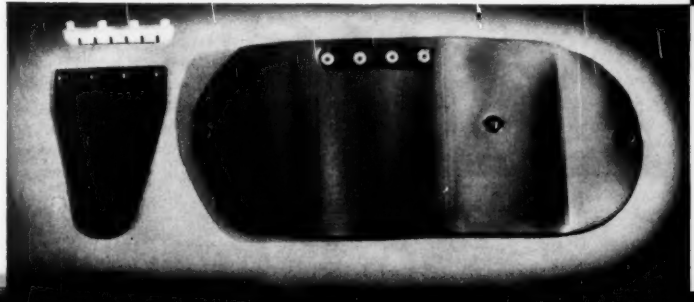
The hook retainer is molded in a single piece with the six U-shaped slots, the three entrance holes, and the connecting slots molded-in. Four studs molded-in to the back of the hook retainer are used to affix the piece to the key case.

Both the hook and the hook retainer are molded for Buxton by American Optical Co. The mold for the key hooks has 24 cavities and has retracting cams to mold the holes in the loop of the hook. Each hook is molded in the open position and is gated with a pin-point gate on the outside of the loop, as shown in the photographs.

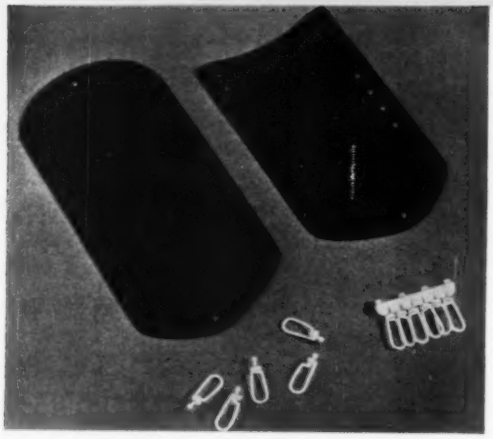
The secondary runners which extend the length of the shot are located on the outside of the cavities



Nylon hooks, molded open, must be closed before assembly to the case

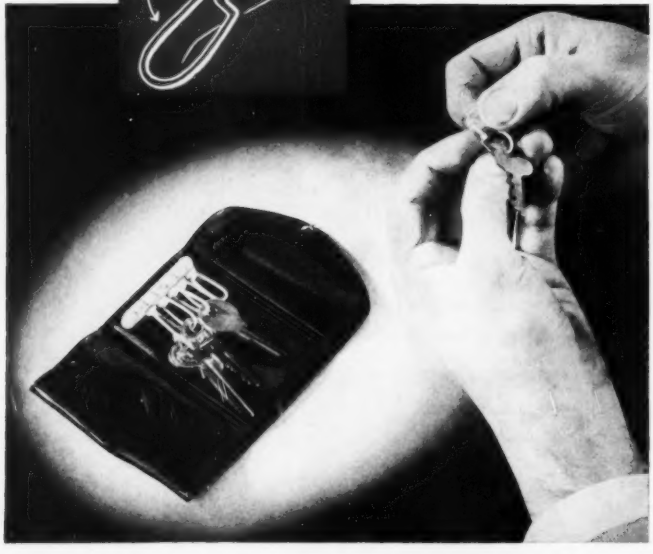


Hook retainer and fiber reinforcing piece are assembled to case by spinning over nylon lugs (see cutaway)



Plastics parts of key case include 20-gage vinyl exterior (left), vinyl lining (right), molded nylon key hooks, hook retainer

To attach key, nylon hook is removed from key retainer by snapping end of hook through narrow channel and then pulling it out through molded hole in retainer. Hook is then opened by pulling ball end through loop. After key is on loop, procedure is reversed



for the hooks. As a result, the side-pull pins run through one edge of the runner, and hence the runner has a series of molded-in grooves. This avoided off-setting the cavities.

Because of the light weight of the pieces, the knock-out pins were also located on the runners. The shot is ejected by eight pins, four on each secondary runner.

The hook retainer mold presented problems because of the varying thickness of the piece and because of the necessity of molding-in short connecting slots only 0.015 in. wide. All slots and holes had to be molded without trace of flash. The mold used has beryllium copper cavities and stainless steel forces. Standard Tool Co., Leominster, Mass., produced the intricate beryllium copper pressure castings. The mold has eight cavities and the pieces are end-gated with pin point gates.

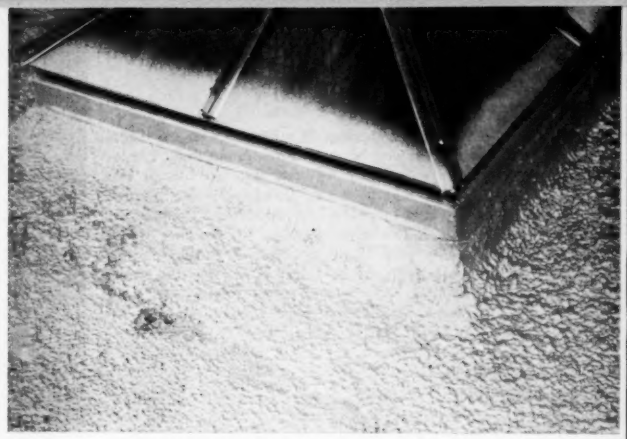
Vinyl Case

When Buxton was ready to go into full production on the nylon parts, it decided to mount the assembly in a vinyl case and market it as the Orleans Key-Tainer. The Orleans trade mark identifies the company's volume line of billfolds made of vinyl sheeting, and the lower price of a vinyl case makes it possible to reach a much broader market than would be possible if the nylon assembly were used in a leather case.

The simple vinyl case designed for the Orleans Key-Tainer has a snapbutton closure and a separate coin compartment with its own snap.

The outside of the Orleans Key-Tainer is a 20-gage vinyl with either a metallic or calf grain finish and the lining is 20-gage vinyl embossed with a satin texture. The first step in the manufacturing operation is to die cut oversize patterns of the cover and lining. The trademark and patent notice are then electronically embossed on the lining, and the snap fastener posts and studs are attached to the cover and lining.

The nylon hook retainer is then attached to the lining and to a 30-gage vulcanized fiber reinforcing piece by spinning over the molded-in studs on the retainer. The cover and lining are then electronically sealed to each other and the snap fastener caps and sockets are attached. The final step before inspection and packing is to insert the six key hooks.



Joint between roof and skylight is completely covered and sealed by sprayed vinyl coating which serves as own flashing

Vinyl coating also caulks cracks while being applied to sidewall; there is no seam between caulking and rest of coating

Vinyl for Outdoor Protection

MANY civilian applications are being found for the vinyl spray coating developed during World War II to protect machinery and equipment in shipment and used after the war in "Operation Mothball." The material, made in accordance with Navy specification 52-C-44, is being used widely to weatherproof exterior and interior walls as well as roofs and ship decks.

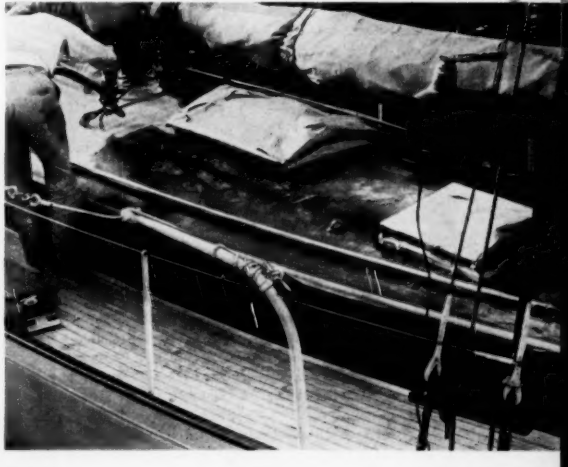
The material, trade-named Cocoon, is an organosol formulation based on Bakelite vinyl resins. It is made by R. M. Hollingshead Co., Camden, N.J., and distributed by Protective Coatings, Inc., Tampa, Fla. Connecticut Coatings, Inc., Greenwich, Conn., is the New England distributor.

According to the manufacturer, Cocoon seals roofs and sidewalls against water, weather, mildew, salt spray, and fumes better than any other commercial process. The coating is applied with spray guns and sets in 20 minutes to form a smooth, continuous seal.

Cocoon can be applied over concrete, gypsum, steel, wood, insulation, or even an old built-up gravel roof. It molds itself onto the material, caulks all cracks and openings, and forms its own integral flashing around windows, skylights, parapets, and other joints. It expands or contracts with any movement of the building, even at sub-zero temperatures, and won't get tacky at 180° F.

The basic Cocoon coating is gray, but virtually any color can be applied as a top coat if desired for the sake of appearance. The top coat is a vinyl paint manufactured by Zapon Div., Atlas Powder Co.

Cocoon has been used successfully in large citrus concentrate plants in Florida. It provides a wall coating which permits the hard scrubbing necessitated by strict sanitation requirements and it stops the moisture and warm humid air penetration which threatened the usefulness of the insulation in the plants' refrigerated areas. It has also been used successfully as a combined waterproofing and decorative covering for old canvas decks on yachts.



Vinyl coating can be sprayed on yacht deck housing over old canvas both to waterproof it and to improve its looks

PLASTICS PRODUCTS

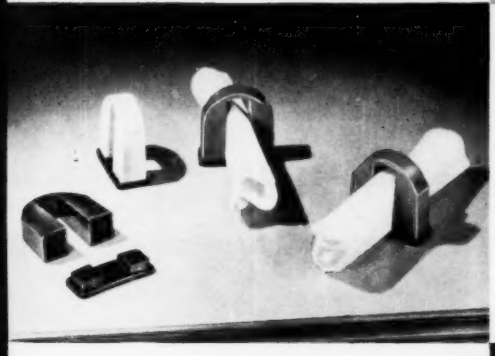
Left — Slide for mounting 35 millimeter stereo transparencies is molded of clear Bakelite styrene. Transparencies are inserted through slots in top of the slides, and a slip of paper identifying the picture can be inserted in center slot at bottom. Companion battery-powered viewer, molded of styrene, lights automatically when slide is inserted. Button on the bottom puts light out if viewer is set down without removing slide. The slides, called Plastaslides, can also be used with other viewers. Manufactured by Deep-Vue Corp., 2717 W. Lisbon Ave., Milwaukee, Wis.

Right — Toy tractor and scraper, 12 in. long over-all, is an authentic scale model of Caterpillar earth moving equipment. Pushing lever on side of toy raises apron so that scraper picks up load of sand which can then be hauled and dumped to suit the needs of the sandbox road builder. Toy is molded of Dow styrene copolymer material in well-known Caterpillar yellow. Made by Precision Specialties, Inc., 212 N. Western Ave., Los Angeles 4.

Left — Attractive and economical salad bowls and other utensils are molded of sawdust and Lauxite urea resin. The granulated wood and resin mixture can be compression molded by conventional methods and the resultant moldings have an attractive mottled appearance and are richer looking than a glossy piece. Made by the Ability Products Co., Pasadena, Calif.

Right — Dart gun has cellulose acetate handle and barrel. Durez phenolic revolving cylinder and back plate. The 8-in.-long gun fires five rubber-tipped acetate darts without reloading. Parts molded by Tech-Art Plastics Co., Inc., Ridgedale Ave., Morristown, Pa., for Selco Novelty Products, Inc., 32-02 Queens Blvd., Long Island City, N. Y.

Right — Double-ended automatic pencil only 6½ in. long also serves as a pocket slide rule. Scales are printed on the pencil barrel and on a transparent tube which slides over the barrel. Outside tube and barrel are made of cellulose acetate or butyrate. Pocket clip, which also serves as a magnifier, is molded of styrene. The entire device weighs only 0.8 oz. Made by Device Development Co. 226 W. 4th St. New York 14, N. Y.



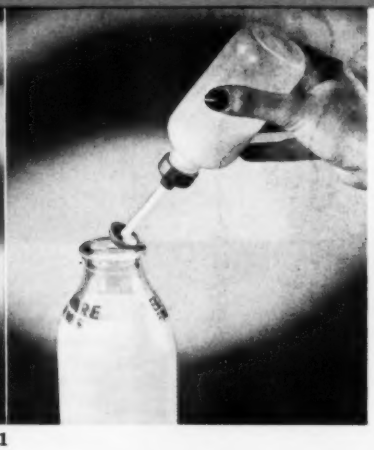
Left — Salt shaker, pepper shaker, and napkin holder are combined in a single unit which eliminates the constant necessity of passing the salt. Each 2¼-in.-high unit consists of a single molded styrene piece and a polyethylene base which snap-fits to it. Base does not scratch the table and can easily be removed for refilling shaker. Made by the Ebie Mfg. Corp., Mogadore 1, Ohio

Right—Watch strap is made of a single piece of vinyl which threads through itself to hold the watch firmly in place. Thus there is no metal to touch the skin and no buckle to catch on cuff of shirt. The vinyl strap is colorful and is unaffected by dirt or perspiration. It is extruded in continuous lengths, embossed with a leather grain, then die-cut to shape. Made in four colors and in widths of $^{9}/_{16}$, $^{5}/_{8}$, and $^{3}/_{4}$ in. by Soren Graae Co. 88 Morningside Drive. New York 27, N. Y.

Left — Lawn sprinkler molded of Tenite II cellulose acetate butyrate has flaring head which emits just the right type spray for lawns. A metal peg attached to the sprinkler folds out of the way when the sprinkler is being held or can be adjusted to any desired angle and set in the ground when sprinkler is to be left alone. Molded by Chaney Plastic Molding Co., 4058 Walnut St., Denver, Colo.; distributed by Capitol Brokerage Co., 1440 11th St., Denver

PLASTICS *Merchandising**

1



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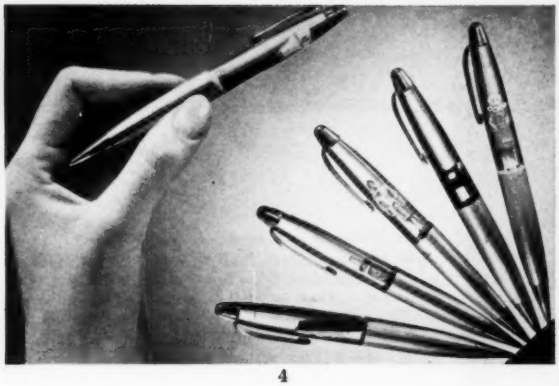

4

1 **Cream remover**—Device for removing cream from top of milk bottles consists of polyethylene bottle and adjustable tube closure. To remove cream, user simply extends the tube, squeezes the bottle to create a vacuum, and inserts the tube to the cream line. When pressure on the bottle is released, the cream is drawn into the bottle.

Richards & Assoc., Ft. Meyers, Fla.

2 **Mending tape**—Strip of ¾-in.-wide 15-gage clear vinyl can be used to mend torn table cloths, shower curtains, or other vinyl items. Strip is applied to wrong side of item and sealed to it by pressing with low heat iron. Thin press cloth is used between tape and iron. The tape, called Plasti-Mend, can also be used to make new items without sewing. Tape 36 in. long retails for 10¢.

John Dritz & Sons, 1115 Broadway, New York 10, N. Y.

3 **Key chain medallion**—Gold plated key ring and chain are attached to faceted acrylic piece with floral design carved in it. The internally carved design has a realistic, three-dimensional appearance. Medallion with chain sells for $1.

Leathertone, Inc., 260 Tremont St., Boston 16, Mass.

4 **Promotional pencils**—Miniatures of well-known products or trade marks are floated in water-clear liquid inside the clear barrels of automatic pencils. Clear barrel section, molded of Tenite I cellulose acetate, screws to the metal part of the barrel.

Progressive Products, Inc., 701 Lehigh Ave., Union, N. J.

5 **Clock toy**—An educational toy, a game, and a puzzle are combined in The Clock. The toy consists of a molded styrene clock face with molded-in depressions to accommodate numbers molded of a contrasting colored material. Children learn

* Reg. U. S. Pat. Office.

the numbers by fitting them in the proper spaces. Movable hands can be used to learn to tell time and tops which come with the set can be spun to play the clock game.

Quartet Mfg. Corp., 1233 S. Wabash Ave., Chicago 5, Ill.

6 **Cribbage board**—Compression molded urea cribbage board has enough holes so that once around the board makes a game. Thus relative scoring position of each player is visible at a glance. Chrome plated metal pegs are stored in molded-in compartment on bottom of the board. Retail price of the board, called Crib-Derby, is $2.50.

Taplin Toys, Inc., 3725 E. 45 St., Minneapolis 6, Minn.

7 **Ornamental horse**—Realistic molded acetate horse 10¼ in. high is spray decorated and fitted with removable molded acetate saddle and vinyl reins. Horse is available without base, with pedestal base, or attached to lid of an acetate utility box.

Superior Plastics, Inc., 410 N. Oakley Blvd., Chicago 12, Ill.

8 **Visor for side mirror**—Exterior rear view mirror on automobile can be protected from rain and shielded from direct sun rays with visor molded of transparent styrene. The visor, called Sunfoil, is adjustable to fit all round mirrors.

Jim Robbins Co., 1555 E. Eight Mile Rd., Hazel Park, Mich.

9 **Wall dispenser**—Swinging butyrate wall bracket holds polyethylene bottle upright when not in use, allows it to be inverted for easy dispensing of hand lotions, detergents, or other liquids. The unit, including 6-oz. Plaxpak bottle, retails for $1.49.

Apsco, Inc., 17 James St., Bloomfield, N. J.

10 **Musical footballs**—Favorite college songs are played by Swiss music-box movements inside footballs molded of Beetle urea. The 4¼-in.-long footballs are available in various school colors and with any one of 25 tunes.

Patent Button Co., Knoxville, Tenn.

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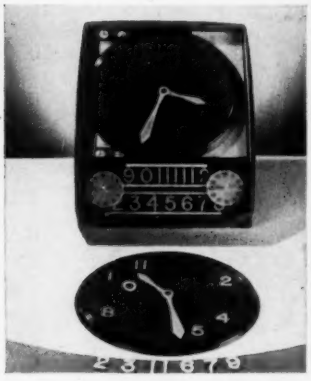

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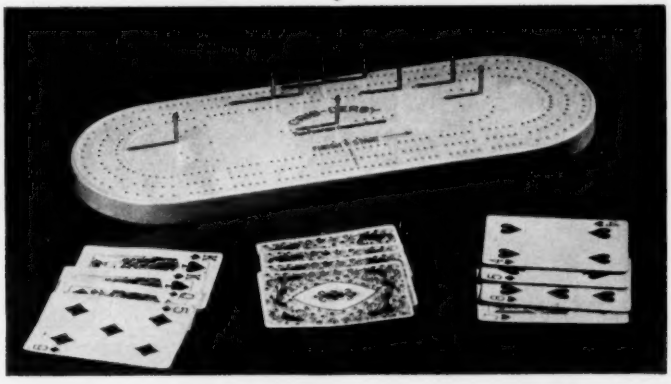

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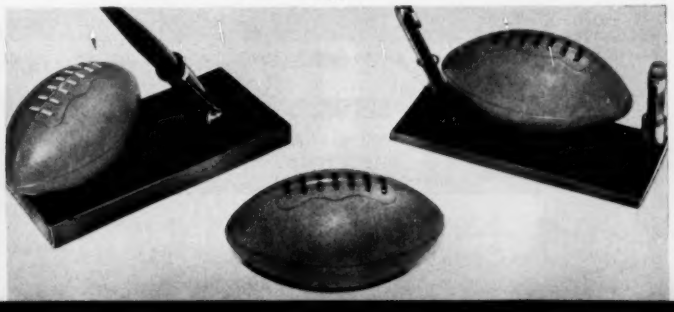
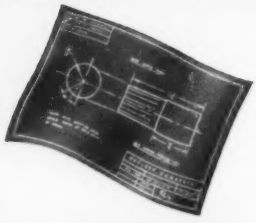
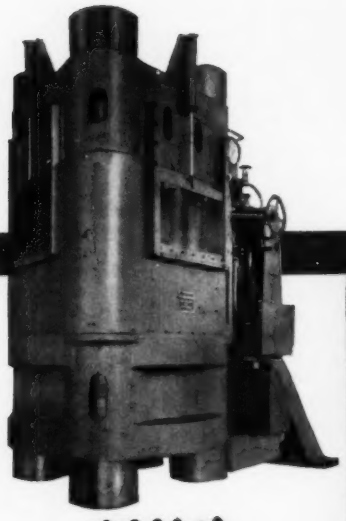


at Midland . . .





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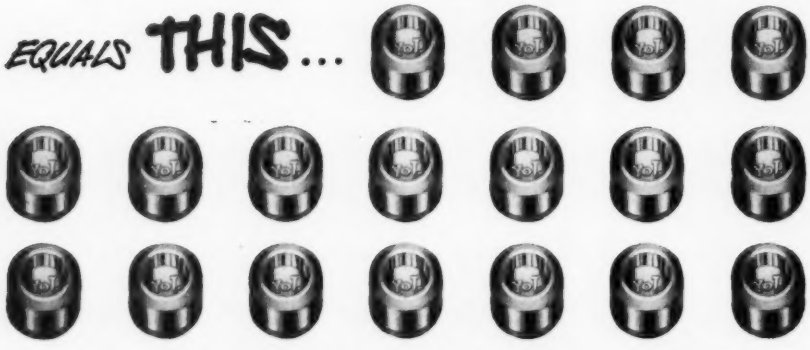

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If it's quality production you want, Hobbed Cavities by Midland represent your most economical means of producing multiple-cavity molds. At Midland no job is too big, no job too small . . . for in addition to normal hobbing facilities, Midland owns and operates the largest hobbing press in the plastics industry, attaining hobbed cavities nearly three times the size formerly possible. To these facilities add skilled craftsmanship and exceptional experience. You can be sure of uniformity at Midland. And price? Just send your blueprint for quotation. No obligation.

HOBBED CAVITIES by MIDLAND

MAKERS OF PLASTIC MOLDS • DIE CAST MOLDS • ENGRAVED DIES • STEEL STAMPS • HOBBINGS • PANTOGRAPH ENGRAVING

MIDLAND DIE AND ENGRAVING COMPANY

1800 W. Berenice Avenue • Chicago 13, Illinois

Made for Bernardin Bottle Cap Co. Inc. Evansville, Indiana

Production of Large Polyethylene Carboys

Bottles with 14 gal. capacity are made on specially built injection machine

by **ENRICO CROSIO**†

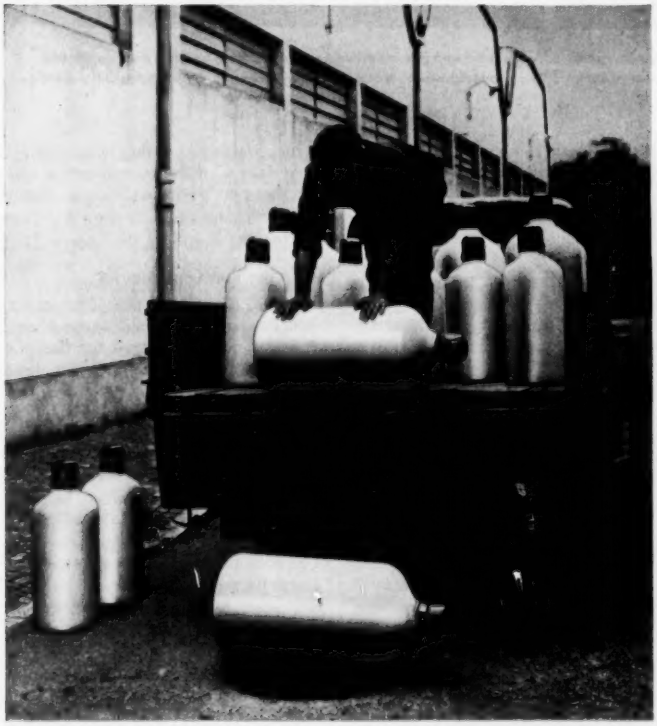
THE shipment of corrosive or costly liquids has always presented problems because of the fragility of the shipping containers. Glass carboys, which have been standard for such shipments, are by their very nature fragile, even though they are housed in all types of protective outer enclosures. The damage caused by the breakage of but one glass carboy of corrosive acid can cost many times the value of the acid itself.

Because polyethylene is flexible, chemically inactive, and practically unbreakable, it is a natural choice for use in the manufacture of this type of carboy. Up until a short time ago, however, the only practical method for producing such large containers was by fabricating them from sheet stock. The economics of this method of production were a positive deterrent to their wide acceptance.

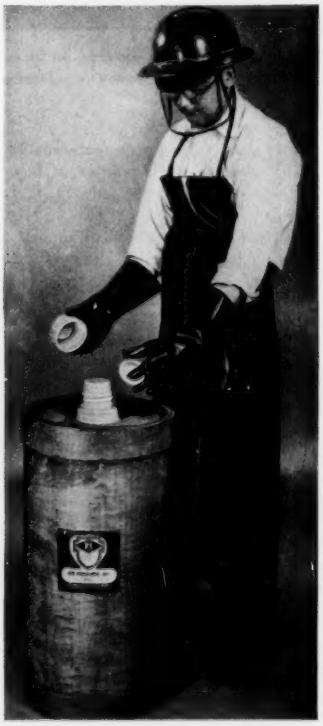
Of course the blow molding method, which is presently used to produce many comparatively small flexible polyethylene containers, is a perfectly feasible way to manufacture these large carboys; however, molding equipment of sufficient size to blow mold this large amount of polyethylene into a one-piece con-

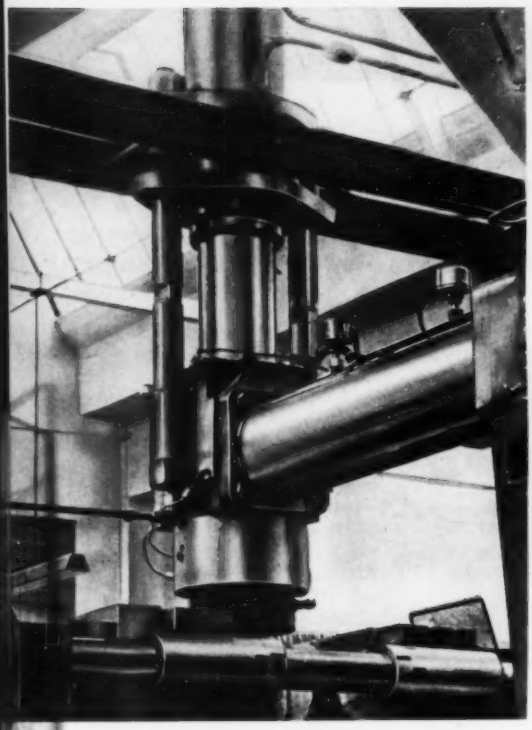
* Reg. U. S. Pat. Office.
† Manager, Pirelli A.E.S., Plastics Div. of Pirelli S.P.A., Milan Italy.

Even without protective outer enclosures, large blown polyethylene carboys can take rough handling without breaking. Chemical inertness of material makes it suitable for shipping acids

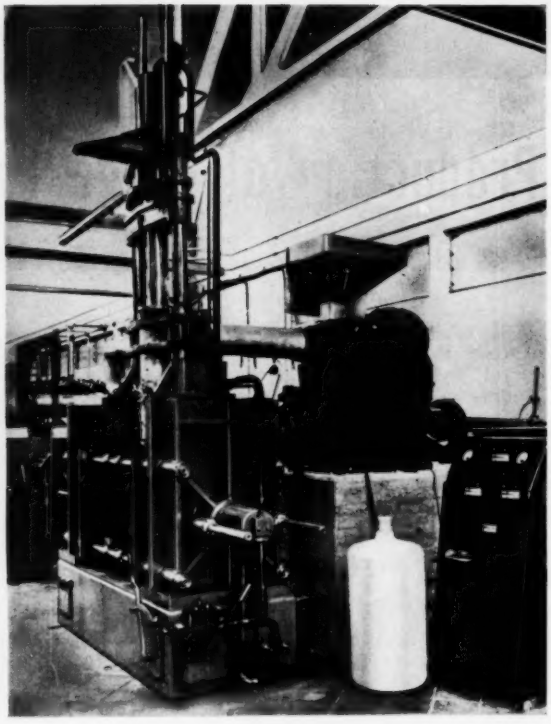


General Chemical ships fluorine chemicals in polyethylene carboy unit weighing 29 lb.





Vertical-acting injection cylinder is filled with plasticized material from extruder preparatory to forming of parison in air



Equipment for blow-molding polyethylene carboys consists of 4-in. extruder, vertical-acting injection cylinder, and horizontal-acting mold halves

tainer had never been constructed until recently. As a matter of fact, the exact equipment used for blow molding smaller bottles had certain features which made it practically impossible to be used in the handling of larger jobs.

Produced in Italy

Some months ago, Pirelli A.E.S., Monza, Italy, undertook production of special equipment for the express purpose of blow molding large carboys. Instead of producing a parison directly from an extruder, it was decided that, due to the large volume of material required, it would be more feasible to produce the parison by means of a variation of injection molding.

Accordingly, the first machine consisted of a horizontal extruder (the sole purpose of which was to pre-plasticize the polyethylene), feeding directly into a vertical-acting injection cylinder. These two machine components were assembled in such a manner that the injection piston could force the plasticized polyethylene downward through a suitable orifice and thereby produce a parison of such a size that, when clamped in a blow molding die, and suitably expanded by compressed air, a uniform walled carboy, with molded threads at the neck, would be produced.

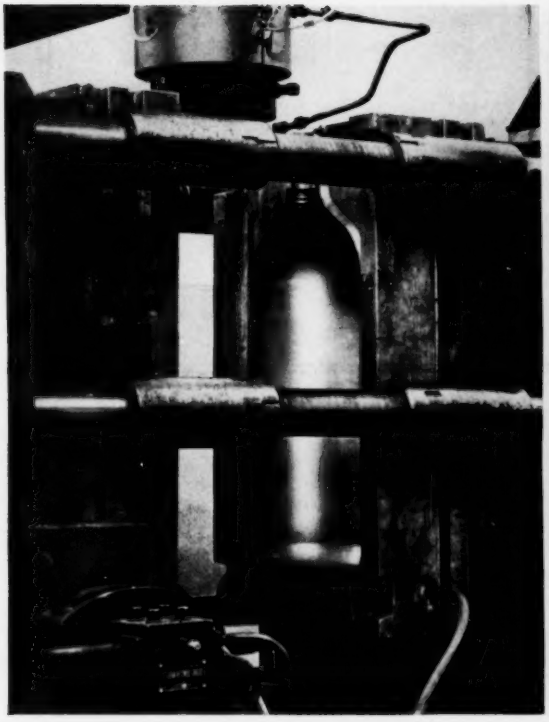
The mold itself consists of two symmetrical halves mounted on two platens each of which is operated by a separate horizontal hydraulic ram. This entire assembly is mounted in a steel frame to which are attached two vertical steel columns, on the top of which is mounted the injection cylinder.

These horizontal-operating mold halves are in the open position until the polyethylene parison has been completely formed by forcing the polyethylene material through the orifice into the atmosphere. Suitable hydraulic valves, which are manually controlled by a single lever, are synchronized in such a way that all movements of the injection ram and of the two horizontal-acting clamp rams will be properly cycled automatically.

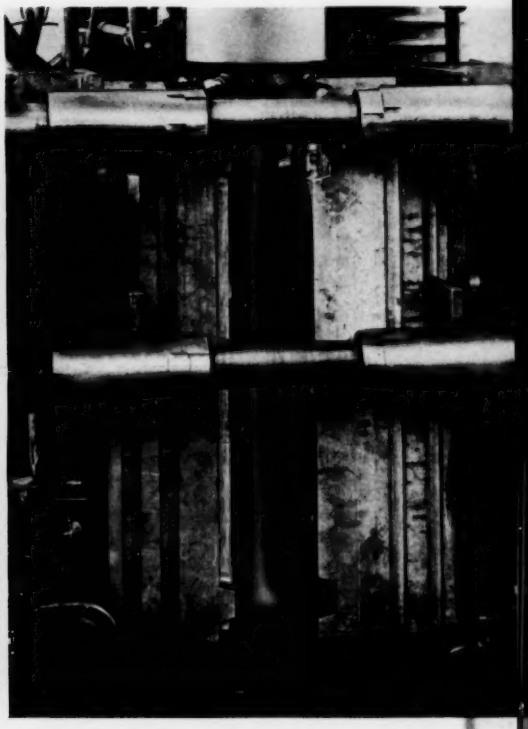
Extruder Run Continuously

In other words, this equipment operates on a semi-automatic cycle. Since the time required for the injection ram to force a complete charge of polyethylene through the orifice is only a few seconds, the extruder pump can be run continuously and not on an intermittent basis. The extruder is driven by a variable speed motor which permits the operator to adjust the delivery from the extruder, so that the required amount of thoroughly plasticized polyethylene material will be delivered to the injection chamber in the time required by the over-all machine cycle.

Although this equipment for blow molding varies to some extent from that used in the United States for



Two symmetrical halves of mold for carboy are mounted on platens, each of which is operated by a separate horizontal-acting hydraulic ram



After parison has been formed in the open mold, the two mold halves close automatically and the hollow parison is inflated

producing smaller bottles, it follows the basic method[1] introduced and patented by the Plax Corp. of Hartford, Conn.

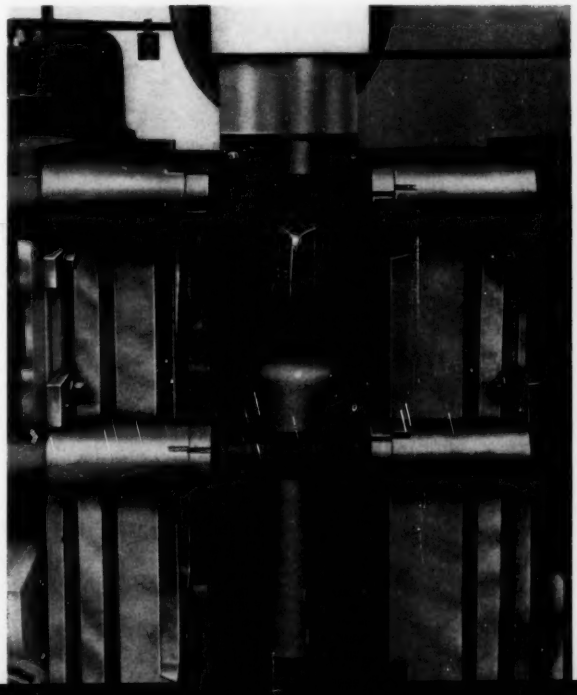
In operation, granular polyethylene material is charged into the hopper of the extruder, in this case a 4 in. unit. The extruder has three separate heating zones from the hopper to the injection chamber which are thermostatically controlled at approximately 140° C., 160° C., and 160° C. The injection chamber, also thermostatically controlled, is held at approximately 180° C.

Steps in Cycle

If a description of the cycle begins at the time the parison has been

(*Continued on p. 106*)

[1] Pirelli is licensed under patents in Italy formerly owned by the Plax Corp.



After blown parison has cooled for 3 to 4 min., mold opens, carboy is removed

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presents

...TO THE WORLD OF PLASTICS

A New 16mm. motion picture in Full Color

BAKELITE COMPANY, *A Division of Union Carbide and Carbon Corporation* UCC
30 East 42nd Street, New York 17, N. Y.

A motion picture that fills a long felt need in the plastics industry

"Flight to the Future" promotes greater understanding of the role of plastics in everyday life. A wide range of plastic applications is shown—industrial as well as consumer. The beauty and usefulness of plastics are dramatized in simple, human terms. Through the medium of plot, color, and action the picture tells the story of an industry and its contribution to the better life.

"Flight to the Future" was produced to have the widest appeal to the greatest possible audience. People who will see it are from every walk of life. Schools and colleges will include this motion picture as part of their curricula. Industrial firms, retail organizations, trade associations, church organizations, men's and women's clubs, civic, commercial, and rural groups will be included in its audience.

Members of your organization may well benefit from viewing *"Flight to the Future."* Arrange a preview showing for them or other groups in your community before general release. Contact Modern Talking Picture Service, 45 Rockefeller Plaza, New York 20, N. Y. There is no charge except transportation costs.

Produced in Hollywood with professional cast.

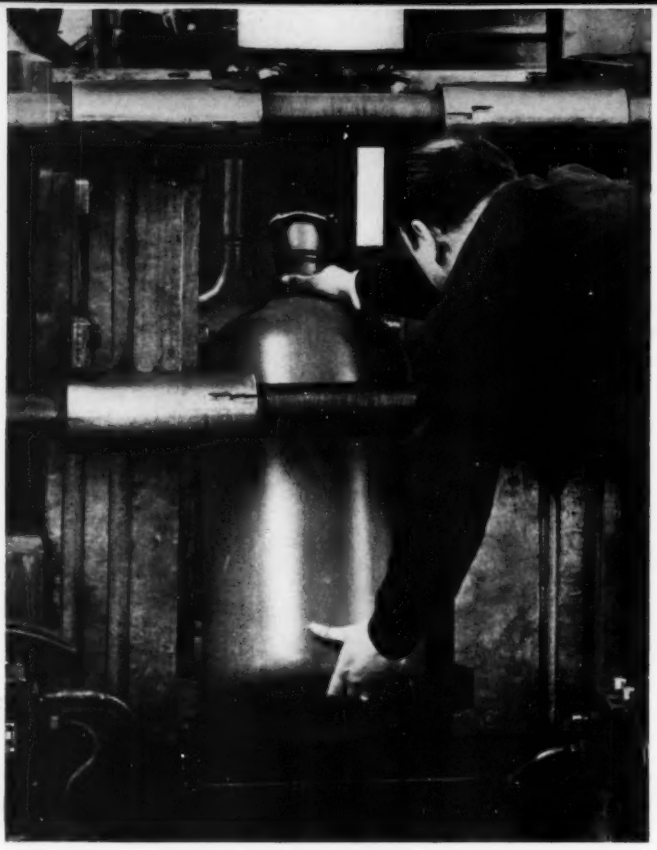
All major sets are constructed from plastics, or trimmed and finished with plastics and resins.

Before general release to the public, *"Flight to the Future"* will be available to the plastics industry, beginning July 21, 1952.

PLASTICS AT PLAY

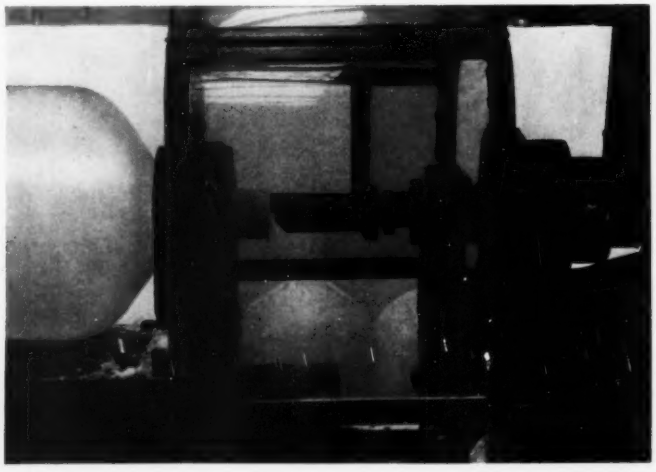
PLASTICS IN THE HOME

PLASTICS BEHIND THE SCENES



Carboy of 14 gal. capacity is manually removed from mold. Complete cycle for producing it takes 5 min. and necessitates extruder output of 120 lb. of material per hour

Like smaller polyethylene bottles, carboys are produced with molded-in exterior threads to accommodate screw closures. Neck of the carboys is trimmed to length on lathe



formed in the atmosphere, the steps are as follows: The hydraulic pressure is removed from the injection ram. With this pressure removed, the pressure exerted by the screw in the extruder enables it to force the plasticized material into the injection chamber. As this material continues to flow into the chamber, it forces the injection ram upward. This continues until the injection cylinder is filled with the required amount of plasticized polyethylene. While this portion of the cycle is proceeding, the two mold halves automatically close, and pinch the lower portion of the tubular parison. Air pressure at 60 p.s.i. is then blown through a duct located in the central mandrel of the orifice on the injection chamber. This air pressure inflates the hollow parison, causing it to expand until it reaches the inner walls of the die. From 3 to 4 min. are then required for the cooling and solidification of the polyethylene. After this time has elapsed, the mold is opened by the operator and the blown carboy is manually removed.

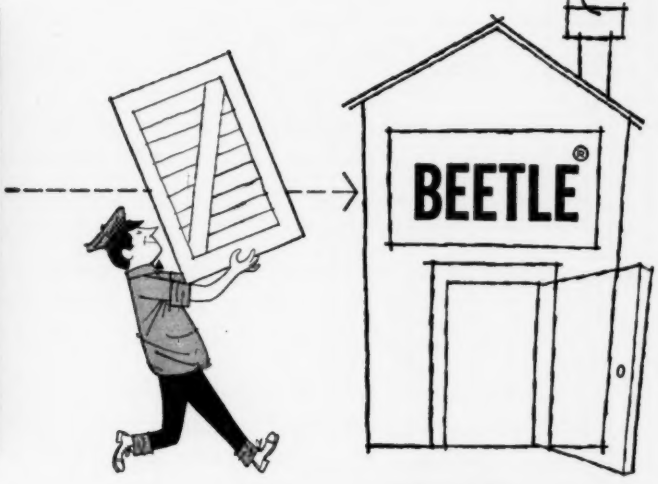
Of course, all during this cooling period the extruder has been operating to refill the injection chamber with plasticized polyethylene, in readiness for the next shot. The complete cycle for the production of a 14 gal. carboy is approximately 5 minutes. Working on this cycle, the extruder worm speed is approximately 48 r.p.m., giving an output of 120 lb. of plasticized polyethylene per hour. Mold clamping pressure is 23 tons; the injection piston is operated by a total hydraulic pressure of 45 tons.

Brought to U.S.

This method for producing carboys was so successful that the Plax Corp. has purchased from Pirelli and installed at their plant at Hartford a refined version of this type of blow molding equipment. Large capacity carboys produced by this method were shown for the first time by Plax at the National Packaging Exposition and Conference at Atlantic City, N.J., this spring. Although it is too early to predict the volume that this business will obtain when the chemical and pharmaceutical industries adopt this new type of plastic carboy as a standard container, the demand for them is already very large.

for better "housing conditions"...

The new Waring Duo-Speed Blendor Celebrity Model PB-5, designed by Mr. Collura and housed in BEETLE plastic. Molded by Watertown Mfg. Co., Watertown, Conn.



the Waring Blendor® *has moved into* BEETLE® *plastic!*

Here are the reasons why Industrial Designer Francesco Collura specified BEETLE plastic for the new addition to the famous Waring Blendor line:

For color permanence . . . molded-in color that can't flake off, that eliminates the need for painting or plating, that gives lifetime color to any product.

For heat resistance . . . thermosetting BEETLE plastic is unaffected by motor heat, so it's the ideal material for electrical appliances requiring trim-looking, compact housings.

For excellent molding properties . . . Designer Collura also preferred BEETLE because it molds so easily and economically, and because its strength is out of all proportion to its light weight. (BEETLE weighs about one-fifth as much as zinc, is lighter than most other housing materials . . . prime considerations in shipping.)

Francesco Collura, S.I.D., noted Industrial Designer, who specified BEETLE plastics for the new Waring Blendor.

For stain resistance . . . water, perspiration, fruit and vegetable juices can't harm BEETLE, and it resists many other types of stains as well.

Got a housing problem in connection with *your* product? BEETLE plastic has increased the efficiency, beauty and sales appeal of so many other products, it may be the answer for you, too! Why not consult us and see.

We may be able to help you meet military specifications where plastics and resins are concerned. What's your problem?

AMERICAN *Cyanamid* COMPANY

PLASTICS DEPARTMENT

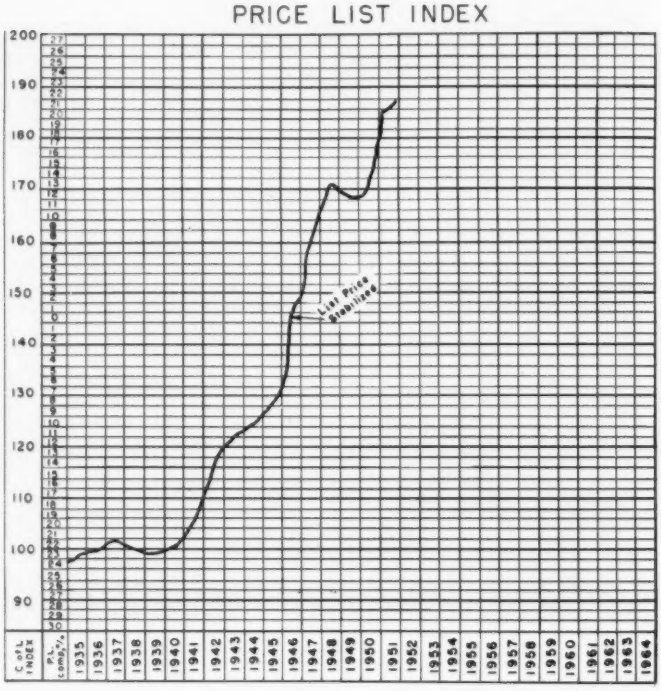
32 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

In Canada: Wrote American Cyanamid Limited, Royal Bank Building, Toronto, Ontario, Canada

Estimating Mold Prices*

Formula method uses cost of living index for fast, accurate work

by WILFRED G. HARVEY†



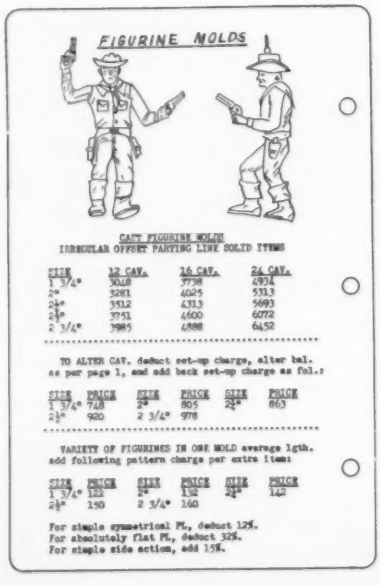
Curve plotted on cost of living index gives price compensation in percent

IT BECOMES apparent when large quantities of molds, say, 1000 or more a year, must be estimated that neither the popular piece-by-piece hourly estimating method nor the educated "guess" method will apply. In the first place, the hourly method would require a prohibitively large staff of estimators, while the educated "guess" method has too much chance for costly error when a multitude of different design molds are being estimated.

Our company has developed a third method which we call formula estimating. This method gives the accuracy of an actual estimate, and at the same time gives the speed of the "guess-work" method. By our formula method, a single engineer, naturally with a liberal background of mold design, can estimate upwards of $50,000 worth of varying design molds per hour. This method

* A paper presented at the Eighth Annual National Technical Conference of the Society of Plastics Engineers.

† Guy P. Harvey & Son Corp., Leominster, Mass.



FIGURINE MOLDS

CAST FIGURINE MOLDS
IRREGULAR OFFSET PARTING LINE SOLID ITEMS

SIZE	12 CAV.	16 CAV.	24 CAV.
1 3/4"	3028	3738	4934
2"	3281	4025	5313
2¼"	3512	4313	5693
2½"	3751	4600	6072
2 3/4"	3985	4888	6452

TO ALTER CAV. deduct set-up charge, alter bal. as per page 1, and add back set-up charge as fol.:

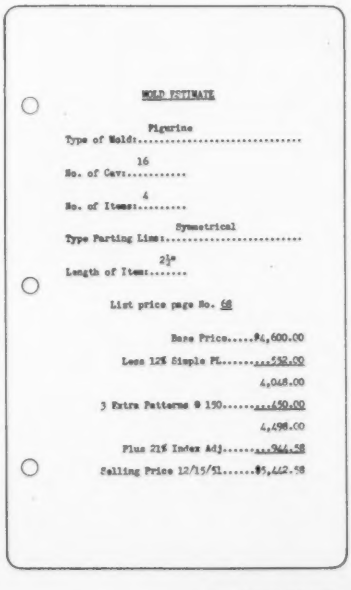
SIZE	PRICE	SIZE	PRICE	SIZE	PRICE
1 3/4"	728	2"	805	2½"	865
2¼"	920	2 3/4"	978		

VARIETY OF FIGURINES IN ONE MOLD average 1gth. add following pattern charge per extra item:

SIZE	PRICE	SIZE	PRICE	SIZE	PRICE
1 3/4"	125	2"	132	2½"	142
2¼"	150	2 3/4"	160		

For simple symmetrical PL, deduct 12%.
For absolutely flat PL, deduct 32%.
For simple side action, add 15%.

Catalog sheet at left gives basic list prices for a certain type of mold, with figures for various numbers of cavities, size of item to be molded, etc. Mold estimate sheet at right shows how these figures are applied. Using this formula method, a single engineer can estimate $50,000 worth of varying designs per hour



MOLD ESTIMATE

Figurine
Type of Mold:.....

16
No. of Cavs.....

4
No. of Items:.....

Symmetrical
Type Parting Line:.....

2½"
Length of Item:.....

List price page No. 68

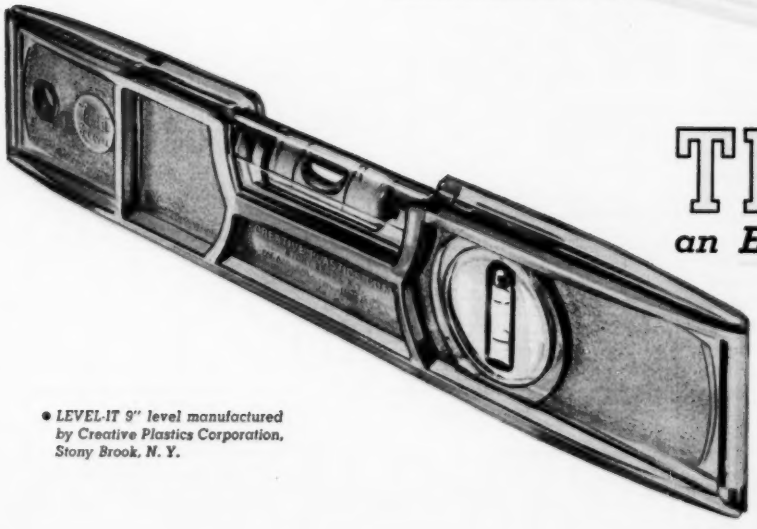
Base Price.....$4,600.00
Less 12% Simple PL.....552.00
4,048.00
3 Extra Patterns @ 150.....450.00
4,498.00
Plus 21% Index Adj.....944.58
Selling Price 12/15/51.....$5,442.58

on the level

Housing molded of shatterproof amber Tenite gives exceptional toughness and good dimensional stability to a modern-design carpenter's level. Highly resistant to impact and corrosion, the streamlined housing serves as a protective, functional mount for the two clear bubble assemblies, which are cemented permanently into the Tenite. The characteristic light weight and warm feel of the plastic make the level easy to handle, pleasant to touch.

A dependable material for the designer, Tenite comes in a wide choice of flows and colors and can be readily molded or extruded to close dimensions. Among its varied applications: tool handles, conveyor rollers, marine floats, industrial pipe.

For further information about Tenite, write Tennessee Eastman Company, Division of Eastman Kodak Company, Kingsport, Tennessee.



• *LEVEL-IT 9" level manufactured by Creative Plastics Corporation, Stony Brook, N. Y.*

TENITE

an Eastman plastic

• Information regarding Tenite is also obtainable through representatives located in Chicago, Cleveland, Dayton, Detroit, Leominster (Mass.), Los Angeles, New York, Portland (Ore.), Rochester (N. Y.), St. Louis, San Francisco, & Seattle; & elsewhere throughout the world from Eastman Kodak Company affiliates & distributors.

further gives the advantage of being able to accurately quote in the field and to quote the same part in several variations of mold design, allowing the customer to pick the one that will suit his budget and requirements the best and, at the same time, with freedom from error—an advantage to both the customer and the mold maker.

Basically, the formula method consists of, first, a catalog with a list price for each basic type of mold design; second, formulas for pricewise adding mechanical motions and design variations; third, a base date with an automatic index to increase or lower prices in agreement with current conditions; and fourth, a cost accounting system to establish new design price lists as the demand arises.

A formula method necessarily must be evolved over a period of time, and backed by a good cost accounting system. In establishing our method, it has been our practice on the completion of each mold to compile a fully detailed cost record. This record has several summaries shown on it: one is an actual cost as of the date of completion; a second summary is list price cost as of our base date.

Approximately 15 years ago when we first established the estimating formula, we reviewed all previous jobs and segregated them into basic design groups. From these groups we made out actual list prices showing size of mold, number of cavities, length of item, etc. To simplify the number of various lists, the types were kept basic, such as molds having hobbed cavities, cast cavities, Kellered cavities, etc. To each of these basic lists, percentage-wise, would be added additional charges for irregular parting lines, slides, angular core pins, and rack and pinion or unscrewing motions. As can be appreciated, with a dozen price lists of the basic designs, formulated so as to add the variations, any one of a good many thousand different mold designs can be accurately estimated in a matter of only a few minutes.

Price Lists Altered

After the price lists were originally established, we naturally had the chore of keeping them current. This was accomplished through checking the list price summary on

GUY P. HARVEY AND SON CORP. **Cost Record No.** _____

CUSTOMER _____
MOLD DESCRIPTION _____
AGENT _____ SALESMAN _____
ESTIMATOR _____ SHOP SUPT. _____
CHIEF ENG. _____ ENGINEER _____
FOREMAN _____ KEYMAN _____
RECORD COMPILED BY _____ BONUS BY _____

ACTUAL COST

PRODUCTION LABOR _____
POLISHING LABOR _____
FOUNDRY LABOR _____
REPAIR LABOR _____
TOTAL MFG. LABOR _____
TOTAL MFG. BONUS _____
FOREMAN BONUS _____
ENGINEERING _____
ENG. BONUS _____

INVOICING

CONTRACT PRICE _____
EXTRAS (Specify) _____
INVOICE PRICE

LIST PRICE

PRODUCTION HOURS _____
POLISHING HOURS _____
FOUNDRY HOURS _____
ENGINEERING HRS _____
TOTAL HOURS _____
AVG. WAGE (10) x [redacted]

TOTAL DIRECT LABOR _____
% OVERHEAD (9) _____
-÷ [redacted] _____
PROFIT _____
PURCHASES _____
COMMISSION _____
COST SELLING PRICE

BONUS

INVOICE PRICE _____
LESS COMMISSION _____
SALES PRICE _____
LESS PURCHASES _____
Bonus Calculated By _____

AVERAGE LABOR (10) _____
[redacted]% OVERHEAD (10) _____
-÷ [redacted] _____
PROFIT _____
PURCHASES _____
PERFORMANCE LIST PRICE (10)
-÷ [redacted] _____
LESS PROFIT _____
(11) ÷ [redacted] _____
MAX DIRECT LABOR _____
LESS MFG. LABOR _____
MFG. BONUS (12) _____
MAX. D. LABOR ÷ [redacted] _____
MAX. ENG. LABOR _____
LESS ENGINEERING _____
ENGINEERING BONUS (13)

(14) REMARKS

(9) As of Quarter Ending _____
(10) Based on Year Ending Dec. 31, 1947
(11) Maximum Overhead and Material
(12) Divide by Total Mfg. Labor for Factor
(13) Paid Quarterly to all Dept. Employees on Hourly Rate Point-Penalty System

LIST PRICE ESTIMATE

Based on Page No. _____

RECORD APPROVED BY

COST PRICE | **CORRECT LIST PRICE (14)**

Attach Supplementary Sheet Here

Production Labor

No.	EMPLOYEE	Scheduled Hours (1) Hours	Rate	Cost	Overtime Hours (2) Hours	Rate	Cost	Penalty Hours (3) Hours	Rate	Cost	LABOR PAID OUT	BONUS PAID (4)
TOTAL HOURS (This Sheet)												

PRODUCTION LABOR (This Sheet)
TOTAL PROD. LABOR (All Sheets)
TOTAL PROD. BONUS (All Sheets)

(1) _____ Hour Work Week
(2) _____ X 40 Hour Rate
(3) _____ X 40 Hour Rate
(4) At _____ Factor per Dollar. Paid on Job Acceptance

{ Plus / Minus } _____% C. of L.

Cost accounting sheets used for establishing list prices for formula method of estimating mold prices. These reproductions were reduced from original work sheet sizes

Attach Supplementary Sheets Here

Polishing Labor (15)	Scheduled Hours (1)			Overtime Hours (2)			Penalty Hours (3)			LABOR PAID OUT	BONUS PAID (4)
No. EMPLOYEE	Hours	Rate	Cost	Hours	Rate	Cost	Hours	Rate	Cost		
TOTAL HOURS (This Sheet)											
									POLISHING LABOR (This Sheet)		
									TOTAL POLISHING LABOR (All Sheet)		
									TOTAL POLISHING BONUS (6)		

Foundry Labor (6)											
RECAST LABOR											
TOTAL HOURS (This Sheet)											
									FOUNDRY LABOR (This Sheet)		
									TOTAL FOUNDRY LABOR (All Sheets)		
									TOTAL FOUNDRY BONUS (6)		

Repair Labor (7)											
TOTAL HOURS (This Sheet)											
									REPAIR LABOR (This Sheet)		
									TOTAL REPAIR LABOR (All Sheets)		
									TOTAL REPAIR BONUS (All Sheets)		

(5) Finishing Operations Only
(6) Include Master Pattern Work
(7) All Work, After Shipment, Without Charge
(8) Paid Quarterly To All Dept. Employees Based On Hourly Rate. Non Penalty.

MATERIALS AND OUTSIDE LABOR	COST
CARBON STEEL	
ALLOY STEEL	
BAR STAINLESS STEEL	
CAST STAINLESS STEEL	
CAST IRON	
COPPER ALLOYS	
CERO-BASE	
INVESTMENT	
PATTERNS AND MODELS (Wood, Plastic, Etc.)	
COMPOSITION MASTER MATERIAL (Resins, etc.)	
PLASTER (Castone, Durok, etc.)	
SCREWS	
DOWELS	
GUIDE POSTS AND BUSHINGS	
EJECTOR PINS	
ELECTRICAL EQUIPMENT	
END MILLS AND CUTTERS	
GRINDING WHEELS	
MOUNTED POINTS	
BURS	
MISC. MATERIAL	
MISC. SUPPLIES	
MISC. TOOLS	
OUTSIDE LABOR (SPECIFY)	
TOTAL COST	
PLUS [redacted]% HANDLING	
TOTAL PURCHASES	

ENGINEERING	Scheduled Hours (1)			Overtime Hours (2)			Penalty Hours (3)			LABOR PAID OUT
No. EMPLOYEE	Hours	Rate	Cost	Hours	Rate	Cost	Hours	Rate	Cost	
TOTAL ENG. HOURS										
									TOTAL ENGINEERING	

each cost record against the list price as each new mold was completed. In this way we were able to note any trends and increases, and alter the price list from time to time accordingly.

In 1947, however, wishing to further simplify the task of keeping the price list current, and to have the list automatically compensate for changes in conditions, we conducted a survey of all business and commercial indexes to see if one would tie into our estimating system. After a considerable amount of examining and back checking, we found that the cost-of-living index as published by the Bureau of Labor accurately agreed with our previous ups and downs in prices, and that each full index point on the Government chart represented ½ of 1%, up or down, on mold prices. (See graph on page 108.)

Consequently, as of July 1947, we froze all of our list prices, and have since used the Government index chart to vary the prices. It is amazing how accurately this index will vary the prices; at the same time, it has the advantage of giving the correct current price at the time of estimating, without the necessity of complicated arithmetic.

Catalog Revisions

Naturally, new designs are developed occasionally, and we are constantly adding new list prices to what you might call our "catalog." When we recognize the need for a new list based on a new design or a new trend, we merely analyze all the cost records that suit that particular trend, and the list price summary given on the cost record automatically gives us what the 1947 basic price would have been. In this way we only have one factor to keep in mind, and that is how much the Bureau of Labor's index has gone up.

While many people will be of the opinion that this is a system that can apply only to a large company turning out a large quantity of molds, we believe that any mold-making company or department, regardless of its size, could effectively work out their own system, similar to ours. In fact, the smaller shops or departments have a comparatively small number of design types, and therefore the over-all record-keeping task is simplified.

WHEN NEEDED . . . a specialist!

No machine has ever been invented to take over this job. Here, a man is needed—a specialist.

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Heat-Resistant Copolymer of Triallyl Cyanurate and a Maleic Alkyd†,††

by PAUL M. ELLIOTT†††

A low pressure laminating resin with superior heat resistance has been developed in a research project sponsored by the Wright Air Development Center. The resin can be handled like standard polyesters, but gives laminates with 181-114 glass fabric having flexural strengths of 40,000 to 47,000 p.s.i. at 300° F. after 200 hours' exposure, and flexural strengths of over 30,000 p.s.i. at 500° F. after exposures of more than 24 hours. The product developed in the course of this research is designated as Vibrin Resin X-1047.

IT was found that commercially available components for polyester resins would not give laminating resins of the desired strength properties at elevated temperatures. This made it necessary to develop a new material which by virtue of inherent chemical properties would not decompose or soften at high temperature. The desired properties were found in triallyl cyanurate (Fig. 1). The six-membered ring nucleus of triallyl cyanurate is a particularly stable molecule, and is also found in the more familiar compound, melamine.

The polyester resin, Vibrin X-1047, which is made from triallyl cyanurate and a specially selected modified maleic alkyd, has essentially the characteristics set forth as desirable at the start of the research project. Table I lists the general properties of the uncured resin. The viscosity, while not as low as that of many of the common polyesters, is believed low enough to permit use of the resin by standard techniques. In rate of cure, the resin is comparable to standard types.

The curing reaction, by which the resin is converted from the liquid to the final solid form, is quite exothermic; hence, curing of thick masses of clear resin tends to give excessive heat buildup during cure. It has been possible, however, by careful technique to make clear castings. Table II shows data derived from such castings. Shrinkage during cure is in the same range as for the standard styrene crosslinked polyester resins.

Dielectric properties were determined by the Materials Laboratory, Wright Air Development Center;

Table I—Properties of Uncured Vibrin X-1047

Appearance	Clear straw
Hellige color	#5
Viscosity (disc) at 25°C., poises	45
Refractive index at 20°C.	1.5156
Specific gravity at 25°C.	1.209
Cure rate at 110°C. (metal cell), sec.	67
Cure rate at 100°C. (10 by 75 mm. tube), sec.	160
Cure rate at 80°C. (10 by 75 mm. tube), sec.	1200
Storage stability	
Uncatalyzed at 25°C., mo.	Over 6
Uncatalyzed at 70°C., hr.	Over 48
Catalyzed (1½% benzoyl peroxide) at 25°C., hr.	Over 48

Air Force Program in Plastics Laminates

The Air Force has many important structural and other applications, both in production and under development, of glass fiber base plastics laminates, in all aircraft. Therefore the Materials Laboratory, Research Division, Wright Air Development Center, located at Wright-Patterson Air Force Base, is conducting research and development on these materials as part of a program on laminates and plastics in general. At present, the following aspects are of principal concern to the Air Force: 1) Improvement of the strength properties of low pressure glass fiber plastics laminates, particularly the wet strength properties of polyester laminates, and development of low pressure plastic laminates with improved strength properties and improved electrical properties. 2) Development of high temperature resistant glass fiber base low pressure plastics laminates and of materials with high strength at elevated temperatures for either short or long time exposure, with suitable electrical properties where required. 3) Development of materials for protecting plastics laminates from erosion in high speed flight through rain and of materials to resist hail, gunblast, and gunfire. 4) Development of non-woven glass fiber reinforcements for plastics laminates, particularly impregnated parallel warp suitable for producing high strength laminates. 5) Development of improved processes for low-pressure laminating. 6) Design data for plastics laminates covering all types of mechanical and physical properties over a wide temperature range.

The Air Force program for the above is accomplished through cooperation with materials, aircraft and engine

(Continued on following page)

* Reg. U. S. Pat. Office

† This article covers results of a project performed for the Air Force on a contract supervised by the Materials Laboratory, Research Division, Wright Air Development Center, Wright-Patterson Air Force Base, Ohio. The statements made represent the opinions of the author and not necessarily those of the Air Force.

††Vibrin X-1047 is being made available for military applications as rapidly as possible by the Naugatuck Chemical Div. of U. S. Rubber Co. The triallyl cyanurate was a new chemical when we first prepared it and found it to have the desired heat resistance properties. However, independent work by American Cyanamid on derivatives of their product cyanuric chloride had led to the preparation of and some study of triallyl cyanurate in their laboratories. American Cyanamid is now undertaking commercial production of the triallyl cyanurate. Production of Vibrin X-1047 by Naugatuck Chemical can be rapid when the triallyl cyanurate becomes available.

††† Naugatuck Chemical, Div. of United States Rubber Co.

(Continued from preceding page) **manufacturers, fabricators, research organizations, and other government agencies. Part is accomplished on projects on Air Force contracts with various organizations, and part without any contracts, by informal but active cooperation and interest of the concerns involved. A series of articles, prepared by some of these companies cooperating with the Air Force, and presented at a conference at the Wright Air Development Center, will be published by *Modern Plastics* covering results obtained in work on some of the above problems. It should be noted, however, that the statements in these articles represent the opinion of the authors and not necessarily those of the Air Force. The cooperation of R. T. Schwartz, Chief, Structural Design Data Branch, Materials Laboratory, Wright Air Development Center, in making these papers available to *Modern Plastics* for publication is gratefully acknowledged. A list of the articles follows:**

"Silane Finish," by Johan Bjorksten and L. L. Yaeger, Bjorksten Research Laboratories (Air Force contract). (See p. 124.)

"Garan Finish RS-49," by Robert Steinman, Garan Chemical Corp. (See *Modern Plastics* 29, 116, Nov. 1951.)

"Owens-Corning 136 Finish," by C. E. Bacon, Owens-Corning Fiberglas Corp. (See p. 126.)

"Linde Silicone X-31 S Glass Sizing," by M. H. Jellinek, Linde Air Products Co.

"Volan (114) Finish," by J. V. P. Torrey, E. I. du Pont de Nemours & Co., Inc.

"High Strength Laminates from Epon Resins," by D. W. Elam and F. C. Hopper, Shell Development Co. (Air Force contract.)

"Vibrin X-1047—A New Heat Resistant Polyester Resin," by P. M. Elliot, Naugatuck Chemical (Air Force contract.) (Article begins on the preceding page.)

"Polyester Resins for Strength Retention at 500° F.," by A. M. Day, American Cyanamid Co. (See p. 116.)

"Low Pressure Lamination of Silicone Resin," by R. Hoffman, Dow Corning Corp. (Air Force contract.)

"Technical Data on CTL 91 LD Phenolic Resin," by N. Korelitz, Cincinnati Testing and Research Laboratories (Air Force contract.)

"Evaluation of New Finishes for Glass Fiber," by G. A. Clark, Materials Laboratory, Research Division, Wright Air Development Center.

"The High Temperature Properties of Stypol 16B—Glass Cloth Laminates," by F. G. Singleton, Mellon Institute.

Table II—Properties of Cured Unfilled Vibrin X-1047[a]

Specific gravity	1.336
Shrinkage during cure, %	9.4
Rockwell hardness	L123; M121
Water absorption (24 hr. at 25°C.), % gain	0.73

[a] Resin catalyzed with 1.5% benzoyl peroxide and cured 1 hr. at 65°C. plus 3 hr. at 110°C.

results are presented in Table III and in Fig. 2. The figures for the laminate seem high in comparison with the figures for the clear resin. The reason for this is not clear at present.

Of greatest interest for possible structural use of the resin are the physical characteristics of glass fiber laminates prepared with it. Table IV presents flexural strength data obtained on 181-114 fabric laminates cured in a 30-min. cycle starting at 185° F. and steadily raising the temperature to 250° F. during the 30 minutes. The laminate increases in strength throughout the long period of heating at 300° F. and is also stronger after 24 hr. at 500° F. than

Table III—Electrical Properties of Vibrin X-1047 at 10,000 mc.

	As Received	*Dry*	*Wet*
Clear Cast X-1047			
Dielectric Constant	——	2.78	2.79
Loss Tangent	——	0.014	0.011
Laminate with 181-114 fabric (36% resin)			
Dielectric Constant	4.22	4.04[a]	5.24
Loss Tangent	0.023	0.012	0.049

[a] The calculated value based on resin figures is 3.98

when first raised to this temperature. This leads to the obvious conclusion that for best properties it would be desirable to postcure the laminate for a period before use or testing. Laboratory tests indicate that postcuring should follow immediately after the initial laminate cure if possible. If there is a delay between curing and postcuring it is essential that the laminate be

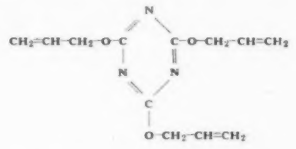
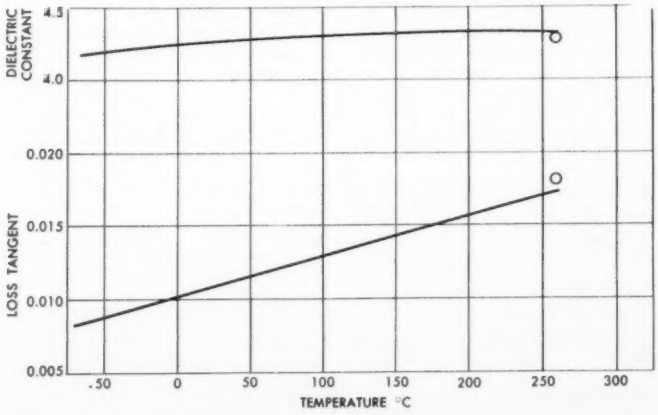


Fig. 1—Structure of triallyl cyanurate

thoroughly dried before being subjected to the high postcuring temperatures; otherwise, moisture may cause partial failure of the laminate during the postcure. Once postcured, the laminates do not show the moisture sensitivity. Table V shows the results of flexural strength tests on laminates postcured for 3 hr. at 500° F. The postcuring has materially increased the room temperature strength and has improved initial ½-hr. test strengths at both 300° F. and 500° F. without hurting the strengths at longer aging periods. In fact, the strength has been raised throughout the entire test period at 300° F.

(Continued on p. 185)

Fig. 2—Dielectric constant and loss tangent at 10,000 megacycles for Vibrin X-1047 laminate at elevated temperature. Curve represents values measured immediately after reaching temperature; point O represents value measured after 45 min. at 260° C. Laminate—181-114—glass fabric; resin content, 37.6% by wt.; specific gravity, 2.06. Mr. G. A. Clark, Materials Laboratory, (Measurements by Wright Air Development Center)



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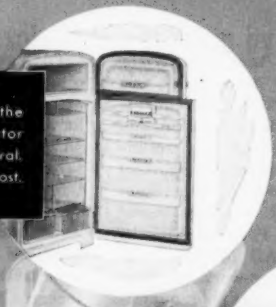

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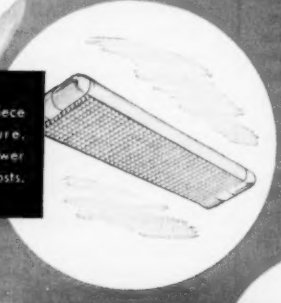

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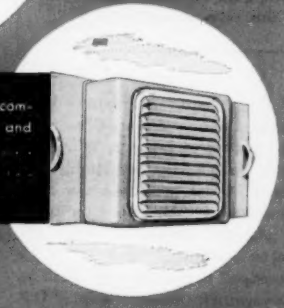

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Polyester Resins for Strength Retention at 500°F.

by H. M. DAY† and D. G. PATTERSON††

Polymerized triallyl cyanurate has been found to have a very high heat distortion point and good stability at 500° F. Glass cloth or glass mat laminates made with TAC alone or in combination with certain highly unsaturated alkyd resins appear to retain their strength properties very well on prolonged exposures at 500° F. For reasonable processing characteristics, the copolymer is recommended. This resin is liquid, but in cases where a dry lay-up is desirable, a solid crystalline resin yielding similar product properties can be made. If self-extinguishing properties are desired along with good high temperature resistance, a fire-resistant modification of this resin is available.

AIR Force requirements have indicated a need for glass fiber reinforced plastic structures, fabricated without solvents at reasonably low pressure, which will retain a large percentage of their room temperature physical properties when exposed to a temperature of 500° F. for a prolonged period. Recent work by the Naugatuck Chemical Div. of U.S. Rubber Co. under a Wright Air Development Center contract indicates that glass cloth laminates bonded with polyester resins containing triallyl cyanurate have good retention of physical properties at 500° F. This monomer, triallyl cyanurate, hereinafter referred to as TAC, was first synthesized in American Cyanamid's Stamford Research Laboratories and patents were issued on the compound and a process for preparing it (U.S. Patents 2,510,564 and 2,537,816). A third patent, U.S.P. 2,510,503, also issued to the American Cyanamid Co., covers the polymerization of this monomer and its copolymerization with many reactive materials. At the time this initial work was done, the demand for a plastic material with the particular combination of properties and high heat resistance was not considered important enough to warrant high temperature evaluation. Based on more recent needs of the Air Force and results obtained with TAC by the U. S. Rubber Co., further work has been done in preparing pilot plant quantities of material, perfecting the process for commercial production, and investigating polymerization and copolymerization both in cast and glass fiber reinforced forms for testing at high temperatures.

† American Cyanamid Co.
†† 77 Bedford St., New York 14, N. Y.

Synthesis of Triallyl Cyanurate

TAC is prepared by reacting cyanuric chloride with excess allyl alcohol in the presence of sodium hydroxide, which acts as an acid acceptor for the hydrogen chloride formed in the reaction. Greatest yields are obtained if the reaction is carried out at 15 to 20° C. The time of reaction is about 4 hours. The excess allyl alcohol and water from the sodium hydroxide solution are removed by vacuum stripping and the mixture is washed free of sodium chloride and dried. The product so obtained is quite pure, melting at approximately 25° C. Table I summarizes some of the chemical and physical properties of TAC. It is completely miscible with such solvents as acetone, benzene, chloroform, dioxane, ethyl alcohol, styrene, and xylene, and is very slightly soluble in water, 0.6 g. per 100 grams.

Table I—Properties of Triallyl Cyanurate

Molecular weight (theory)	249.26
Appearance at 30° C.	Colorless liquid
Melting or freezing point, °C.	27 (99.5% purity)
Boiling point, °C. at 2 mm. Hg.	162
Density, g./cc. at 30° C.	1.1133
Viscosity at 30° C., cps.	12.55 ± 0.03
Refractive index at 25° C.	1.5049

TAC readily polymerizes, using conventional peroxide catalysts such as benzoyl peroxide, to give a clear hard polymer. The cast material has an ASTM heat distortion temperature higher than 200° C. An indication of the exotherm behavior can be seen from the following data, which were obtained by placing 10 g. of TAC catalyzed with 2% of Luperco ATC in an 18 by 150 mm. test tube, centering a thermocouple in the resin mass, and recording the exotherm behavior after the assembly was placed in a constant temperature bath. At 100° C. the polymerization was quite exothermic while at 90° C. only a very mild exotherm was recorded even after 1 hr. heating.

	Bath temperature	
	100° C.	*90° C.*
Time to peak exotherm, min.	6½	60
Peak exotherm, °C.	207	107

Glass cloth laminates made by saturating ECC 181-114 Fiberglas cloth with TAC catalyzed with 1% Luperco ATC (equal parts of benzoyl peroxide and tricresyl phosphate) and pressed at 50 p.s.i. pressure between shims for 1 hr. at 105° C. showed good strength properties at 500° F., confirming the work done by the U. S. Rubber Co.:

Test Temperature	*Flexural strength*
° F.	*p.s.i.*
77	27,100
500, after 0.5 hr.	21,300
500, after 24 hr.	27,900
500, after 50 hr.	22,600

The increase in flexural strength after 24 hr. is undoubtedly the result of further curing of the resin. The laminate had a resin content of 38 percent.

There are certain disadvantages to

(*Continued on p. 120*)

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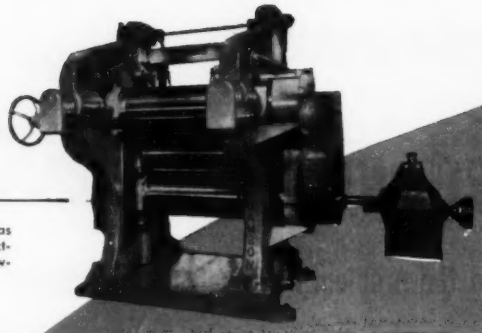

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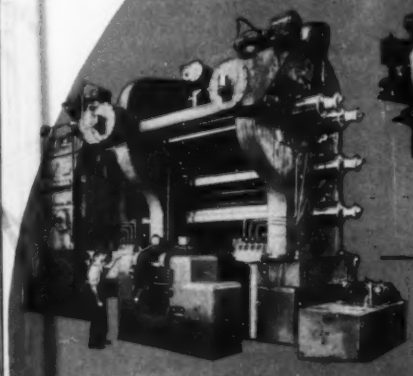

36" x 92" FOUR-ROLL PRECISION CALENDER

Designed especially for the production of thin plastics film up to 72" wide. This unit also is equipped with roller bearings; has roll crossing and zero clearance equipment, motorized roll adjustments, separate pinion stand with universal couplings and flood lubrication.

24" x 68" FOUR-ROLL DELUXE PLASTICS CALENDER

Produces 57" wide film at high speeds. Has roller bearings, zero clearance equipment, roll crossing device, roller bearing universal couplings, drilled rolls, motorized stock guides and flood lubrication. Drive is through a separate pinion stand which has its own complete flood lubrication system.

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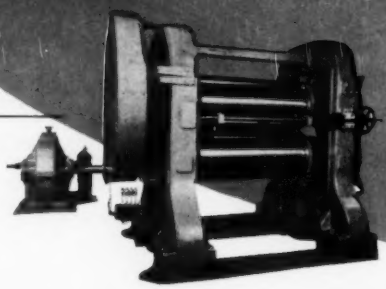

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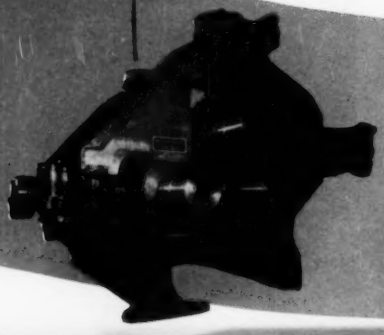

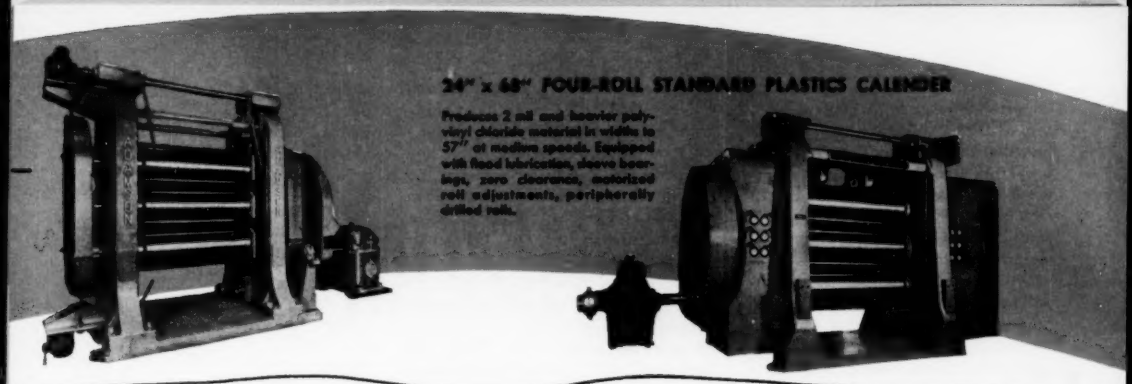

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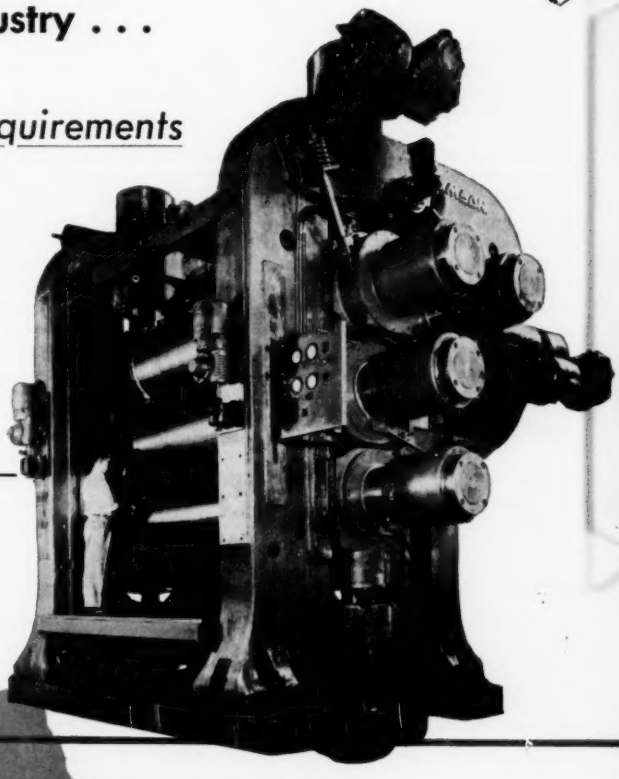

32" x 92" FOUR-ROLL PRECISION CALENDER—

This unit is geared to produce 72" wide vinyl film, 2 mils and less in thickness, at production speeds up to 150 YPM. It is equipped with anti-friction bearings, zero clearance, motor operated stock guides, motor operated roll crossing device, flood lubrication, universal couplings, pinion gear stand, drilled rolls and automatic temperature control. The electrical drive includes separate DC motors for each component, with speed trimming devices. Auxiliaries consist of embossing equipment, cooling unit and automatic turret-type windup.

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using TAC alone as a laminating material. First, it is expensive since the synthesis utilizes a costly starting material. Secondly, TAC is a very thin liquid at laminating temperatures, making it difficult to obtain laminates having a proper resin content following normal laminating techniques.

TAC is readily compatible and copolymerizes with highly unsaturated polyester alkyds, and this approach was taken in developing heat-resistant formulations having good handling properties. Glass cloth laminates were prepared from resins containing varying ratios of TAC and a highly unsaturated alkyd resin, and the flexural strength properties were measured at 500° F. after exposure to 500° F. for various periods of time. These laminates, consisting of 11 plies of ECC 181-114 Fiberglas cloth, were made by saturating the cloth with resin catalyzed with 1% Luperco ATC and pressing at 50 p.s.i. between shims for 1 hr. at 105° C. The data in Table II show that TAC can be combined with unsaturated alkyd resins to give laminating resins of varying viscosity. Fiberglas cloth laminates made from these combinations show the same excellent flexural strengths at 500° F. and thermal stability as the all TAC glass cloth laminate. At this temperature the ratio of unsaturated alkyd to TAC does not appear to be critical, thus permitting a rather broad viscosity range suitable to many different types of applications.

Laminac Resin PDL 7-669

Of the various blends tried, Experimental Laminac Resin PDL 7-669 appeared to have the best handling properties and was chosen for further evaluation. This resin is a polyester laminating resin possessing unusually high strength properties at elevated temperatures. It is a nonvolatile liquid having a viscosity of 65 poises at room temperature and can be cured with conventional polyester curing catalysis such as benzoyl peroxide or tertiary butyl hydroperoxide. Except for postcure, no special techniques are required in using it. Cures can be effected at temperatures below 120° C. and at pressures as low as 50 p.s.i.

There is much to be learned about this resin as it is still an experimental material. However, as a guide to possible applications, Table III lists the liquid resin and cured resin properties that have been obtained in the laboratory.

Laminates were prepared by the following procedure. The glass cloth was saturated with resin catalyzed with 1% Luperco ATC by pooling the resin in the middle of the cloth and distributing it evenly over the cloth. This process is repeated with each layer of cloth until the desired number of plies are obtained. Eleven plies of cloth were required to give the ⅛-in.-thick laminate used in the physical testing work. The uncured laminate was placed between cellophane and pressed between ⅛-in. shims for ½ hr. at 105° C. and 50 p.s.i. The cured laminate is hard, rigid, and can easily be handled directly from the press. While a laminate made following this procedure has good strength properties, these strength properties can be greatly improved by postcuring. A typical Fiberglas 181-114 glass cloth laminate as taken from the press showed a flexural strength at room temperature of 31,500 p.s.i.; postcuring for 3 hr. at 500° F. increased the flexural strength to 46,800 p.s.i. In many applications it may be desirable and necessary to postcure.

Laminates made from 181 cloth but with a Garan[1], Bjorksten[2], or 136[3] finish, show considerable improvement in strength properties and retention of these properties under wet conditions. It is believed that all three of these products employ substituted silanes as the finish or a portion of it. Using the Garan or 136 finish cloth gives improved heat strength properties, as shown in Table IV.

Glass mat laminate made with PDL 7-669 and having a resin content of 67% has shown the following flexural strengths:

At 77° F.	21,000 p.s.i.
At 500° F., after 3 hr.	14,700 p.s.i.
At 500° F., after 24 hr.	13,000 p.s.i.

Improvement in the sizing of the mat similar to that done with cloth can be expected to increase these strength values.

A glass cloth laminate with a resin content of 41% was exposed to temperatures of 550° F. and 600° F. for ½ and 4 hr.; the resin losses were as follows:

Table II—Properties of TAC Resins—181-114 Laminates

Laminac resin	*Resin viscosity*	*Resin content of laminate*	*Flexural strength at 500° F. after* ½ *hr. at 500° F.*	*Flexural strength at 500° F. after* 24 *hr. at 500° F.*
	poises	*%*	*p.s.i.*	*p.s.i.*
100% TAC	0.12	38	21,300	27,900
PDL 7-683	2-3	36.2	21,700	32,300
PDL 7-669	65	41	25,700	32,800
PDL 7-682	400	37.7	20,400	27,400

Table III—Properties of Experimental Laminac Resin PDL 7-669

Resin properties	
Appearance	Clear straw
Viscosity, poises	50-65
Refractive index	1.5112
Storage stability	
Uncatalyzed, at 25° C., mo.	>6
Uncatalyzed, at 55° C., days	>5
Catalyzed, 1% Luperco ATC, at 25° C., days	>6
Catalyzed, 1% Luperco ATC, at 40° C., hr.	18-24
Catalyzed, 1% Luperco ATC, at 55° C., hr.	12-18
Physical properties of cured[a] unfilled resin	
Specific gravity	1.346
Shrinkage during cure (density change), %	10.5
Refractive index at 25° C.	1.550
Heat distortion, °C.	Approx. 270
Barcol hardness	60-70
Water absorption (24 hr.) at 25° C.	0.39
Flexural strength at 25° C., p.s.i.	7,200
Flexural strength at 80° C., p.s.i.	2,800
Flexural modulus at 25° C., 10^6 p.s.i.	0.75
Flexural modulus at 80° C., 10^6 p.s.i.	0.59
Armstrong abrasion resistance[b], mls. loss per 100 cycles	0.193
Chemical resistance of cured unfilled resin	
0.5 N NaOH (24 hr. at 25° C.), % change in weight	+0.37
Conc. HCl (24 hr. at 25° C.), % change in weight	−0.60
Acetone (24 hr. at 25° C.), % change in weight	−0.23

Dielectric properties at 60 cycles

Temp. °F.	*Dielectric constant*	*Dissipation factor*
79	3.97	0.016
167	4.25	0.013
250	4.31	0.009
302	4.22	0.007
356	4.14	0.006
439	4.10	0.012
460	4.31	0.027

[a] Resin catalyzed with 1% Luperco ATC; cure cycle 8 hr. at 120° F., 9 hr. to 250° F., and 2 hr. at 250° F.
[b] ASTM Bulletin No. 143 (1946). Commercial melamine laminates lose 0.100 mls. per 100 cycles.

[1] Garan Chemical Co., Los Angeles, Calif.
[2] Bjorksten Research Labs., Madison, Wis.
[3] ECC 181-38 finish 136, Owens-Corning Fiberglas.

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Temp. °F.	Time hr.	Resin loss %
550	½	3.5
550	4	24
600	½	14
600	4	62

These data indicate that Laminac Resin PDL 7-669 laminates will stand higher temperature than 500° F. for short periods of time. At 600° F. the loss in resin is quite rapid.

Heat- and Fire-Resistant Resin

Experimental Laminac PDL 7-669, while having excellent heat resistance, is not fire resistant, and in many applications fire resistance will undoubtedly be required. A limited amount of work has indicated that Laminac Resin PDL 7-669 can be modified as exemplified by Experimental Laminac Resin PDL 7-680 to give fire resistance without sacrifice of flexural strength properties at 500° F. The latter resin is a nonvolatile white opaque liquid polyester resin having a viscosity of approximately 150 poises. The following flexural strength data were obtained on 11-ply Fiberglas 181-114 glass cloth laminate having a resin content of 31 percent. As in the previous work, 1% Luperco ATC catalyst and a cure cycle of 0.5 hr. at 105° C. was used in making these laminates.

At 77° F.	37,500 p.s.i.
At 500° F., after ½ hr.	24,600 p.s.i.
At 500° F., after 3 hr.	30,600 p.s.i.
At 500° F., after 24 hr.	35,400 p.s.i.

The above strength values are quite comparable to the previous values obtained on Fiberglas 181-114 non-fire-resistant PDL 7-669 laminate.

Fire resistance is a misleading term unless defined. As generally used in the polyester field, fire resistance does not mean the plastic will not burn; rather it means the plastic will be self-extinguishing after exposure to a flame for a definite period of time. In determining whether a resin is fire resistant or not, an Underwriters Laboratory Approval test was used. Briefly, a 1 by 9 by $\frac{3}{32}$ in. specimen of the laminate is suspended vertically so that 1 in. of the laminate is exposed in a 5-in. flame, 1-in. blue core, from a Bunsen burner. The sample is exposed for 30 sec. and then the flame is removed. To be fire resistant, the exposed laminate must be self-extinguishing in less than 20 seconds. Glass mat laminates made with Experimental Resin PDL 7-680 were self-extinguishing in less than 2 sec. even after the sample had been exposed to 500° F. for 24 hours. Glass cloth laminates under similar conditions were self-extinguishing within 2 seconds. For comparison, neither PDL 7-669 glass mat nor glass cloth laminates are self-extinguishing.

Table IV—Effect of Fabric Finish on Flexural Properties of 181-Fiberglas Laminac PDL 7-669 Laminates

	181-114 Fiberglas, chrome finish	181 cloth Garan finish	181-38 cloth 136 finish
Resin content of laminate, %	41	37.2	42
Flexural strength			
At 77° F., p.s.i.	31,500	41,900	39,200
At 500° F., after ½ hr., p.s.i.	25,700	28,400	——
At 500° F., after 3 hr., p.s.i.	27,200	34,700	30,300
At 500° F., after 24 hr., p.s.i.	32,800	39,800	——
Flexural modulus			
At 77° F., 10^6 p.s.i.	2.4	2.33	——
At 500° F., after ½ hr., 10^6 p.s.i.	2.4	2.34	——
At 500° F., after 3 hr., 10^6 p.s.i.	2.15	1.99	——
At 500° F., after 24 hr., 10^6 p.s.i.	2.48	2.02	——

Heat-Resistant Resin for Dry Lay-Up

For some types of fabrication it may be advantageous to utilize a solid crystalline type resin which can be coated onto cloth or mat from a hot melt or suspension so as to give a relatively dry, easily handleable impregnated stock. For this purpose Experimental Laminac Resin PDL 7-679 has been formulated. This resin is very similar in formulation to PDL 7-669 previously described, except that it is a waxy crystalline solid instead of a liquid, and that it has a melting point of approximately 185° F.

As a result of a limited amount of work with this resin, the following method of application is recommended for impregnation. A 50% solids suspension is made by agitation of the solid resin in an equal weight of acetone. This suspension is thioxtropic, that is, it is almost solid when allowed to stand without agitation but becomes fairly liquid when stirred. Then 1% Luperco ATC is added and dissolved, and the suspension is placed in an impregnation tank where cloth or mat is run through it. Squeeze rolls are utilized to control resin content at about 45 percent. An impregnation speed of 0.8 ft./min. was used in the laboratory equipment and the impregnated materials were run through an infrared drier to remove the acetone. Care must be taken to use the lowest temperature practical so as to prevent premature polymerization of the catalyzed resin. The dried impregnated cloth is practically tack-free and can be rolled between cellophane separator sheets and shipped. If in application a tacky impregnated sheet is wanted, Laminac PDL 7-669 may be combined with Experimental Laminac Resin PDL 7-679 in the impregnating solution; equal parts of each give a tacky sheet that may be desirable in some lay-up applications. Stability tests on impregnated material are not complete, but the material is expected to remain in a usable condition for a number of months at temperatures less than 104° F.

Laminates made from 12 plies of ECC 181-114 Fiberglas cloth impregnated with Experimental Laminac Resin PDL 7-679 as above to 45% resin content, pressed at 50 p.s.i. between shims, and cured for ½ hr. at 105° C., showed a final resin content of 38 percent. Laminate properties are given below:

At 77° F.	33,000 p.s.i.
At 500° F., after ½ hr.	25,800 p.s.i.
At 500° F., after 3 hr.	33,100 p.s.i.
At 500° F., after 24 hr.	29,000 p.s.i.

Proposed Uses

Applications for these resins will undoubtedly suggest themselves in clear and filled castings and glass fiber reinforced laminates and moldings where some combination of the following properties are desired: 1) High heat distortion point; 2) Good high temperature stability; 3) Low degree of change in electrical properties over a wide temperature range; 4) Fire resistance; 5) High degree of chemical and solvent resistance.

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Vinyl Silane Size for Glass Fabric†

by JOHAN BJORKSTEN and L. L. YAEGER††

THE necessity for improved wet strength retention of glass fabric base polyester resin laminates resulted in the Materials Laboratory, Wright Air Development Center, initiating the development of improved finishes for the glass fabrics. The objective was to obtain a finish which would produce glass fabric laminates with substantially better properties than can be obtained with 114-sized fabric. The 114-sized fabric polyester resin laminates retain approximately 60% of their dry flexural strength at moisture equilibrium.

The first objective was to rapidly screen the many possible compounds that it was considered might improve the wet strength of the glass fabric base polyester resin laminates in order to find the best type. Evaluation in the screening tests included four types: zirconium complexes, nickel complexes, titanium halides, and silanes. The zirconium and nickel complexes proved to be on a par with 114 size and were, therefore, not further studied. The titanium halides weakened the glass fibers and destroyed their advantages in adhesion. Consequently the silanes were singled out for further study.

Table 1—Effect of Sizing Material on Retention of Wet Strength of Glass Fabric Laminates

Sizing	Catalyzed Resin Used	Flexural Strength: Dry	Flexural Strength: After 3-hr. boil	Retention of dry strength after 3-hr. boil
		10^3 p.s.i.	10^3 p.s.i.	%
181-114	Laminac 4128	53.8	32.1	60
181-BJY	Laminac 4128	64.5	64.0	99
181-114	Laminac 4129	61.0	40.0	66
181-BJY	Laminac 4129	78.0	67.4	86
181-114	Marco MR 28 C	49.6	29.6	60
181-BJY	Marco MR 28 C	74.8	63.6	85
181-114	Marco MR 29 C	44.4	22.9	52
181-BJY	Marco MR 29 C	69.0	63.4	92
181-114	Paraplex P 43	61.6	36.7	60
181-BJY	Paraplex P 43	72.5	67.5	93
181-114	Plaskon 911-11	46.5	28.1	60
181-BJY	Plaskon 911-11	66.0	61.5	93
181-BJY	Plaskon 920-11	62.7	51.0	81
181-114	Selectron 5003	45.1	23.3	52
181-BJY	Selectron 5003	78.0	73.5	94
181-114	Vibrin 112	53.5	28.1	53
181-BJY	Vibrin 112	65.6	60.8	93
181-BJY	Vibrin 132	58.6	51.4	88

It was felt that the ideal solution would be to bind chemically to the glass a grouping participating in the reaction of the resin and binding the resin and the glass together as one giant molecule. The simplest way of doing this was to use a vinyl halo silane as the size. The halogen would split off, leaving the vinyl group chemically bound to the glass via one silicon atom; and the alkyd resins, which contain styrene (vinyl benzene), would then include this glass bound vinyl group in their polymerization, thus creating the desired chemical bond between glass and plastic.

This was accomplished, and the pertinent processing details worked out. It was found that, for good results, the vinyl silane treatment should be followed with a water wash and that no other silane, including the allyl silanes, gave at all comparable results. In addition to the reduction in the moisture sensitivity of the composite laminates, the use of beta-chloroallyl alcohol with the vinyl halo silane raised the original dry flexural strength of the laminate an additional 15 to 20 percent.

The vinyl chloro silane is applicable either in the liquid phase, from a solution in mineral spirits, carbon tetrachloride, or other organic solvents, or in the gaseous or vapor phase.

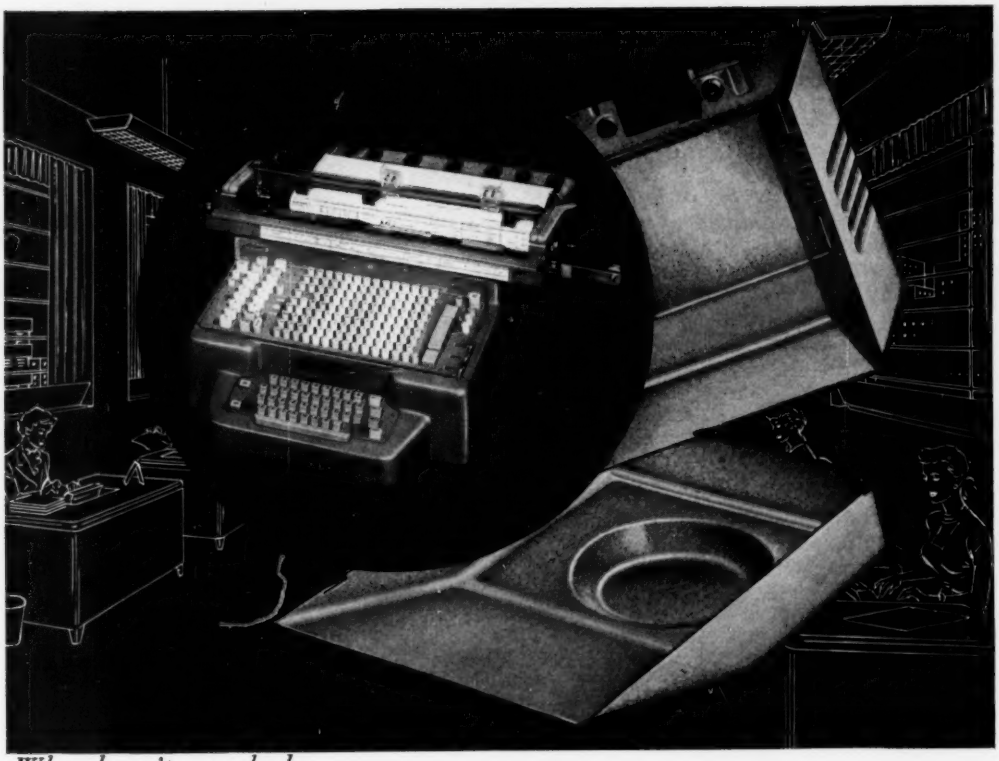
The following steps are involved in liquid phase application: 1) Mixing and diluting the materials to a predetermined concentration; for example, a 3.5% solution in xylol has been satisfactory. 2) Sizing in immersion type equipment similar to that now available except for the lining materials and a hood for venting the escaping gases. After the sizing materials have been mixed and introduced into the equipment, the fabric is passed through. 3) Drying of the fabric at 50 to 70° C. 4) Washing in water, in equipment similar to the sizing apparatus, except that no hood is required. 5) Drying at 50 to 70° C.

In vapor phase processing there is only one drying operation as compared with two for the liquid phase. The vapor phase application involves the following steps: 1) Producing the vapor (boiling point 94° C.) from a heated kettle. 2) Transferring the vapor to the treating chamber, the vapor must be kept at an elevated

(*Continued on p. 188*)

† This article covers results of a project performed for the Air Force on a contract supervised by the Materials Laboratory, Research Division, Wright Air Development Center, Wright-Patterson Air Force Base, Ohio. The statements made represent the opinions of the authors and not necessarily those of the Air Force.

†† Bjorksten Research Laboratories.



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Finish 136 for High Wet Strength Laminates

by C. E. BACON†

THE reinforced plastics industry has been continually trying to improve the physical properties of reinforced plastics. The effort has not only been to obtain higher physical properties, but to maintain those physical properties under conditions of equilibrium at high humidity.

A laminate prepared with ECC-181 fabric, heat cleaned, has a dry flexural strength of 58,000 p.s.i. When this laminate is wet, that is, after being boiled for 2 hr., the flexural strength drops to about 25,000 p.s.i. A 2-hr. boil on a $\frac{1}{8}$-in.-thick laminate, has about the same effect as 30 days immersion. This certainly points out the need for better water-resistant adhesion between the glass and the resin.

The finish that has been currently used for a number of years, Finish 114, produces properties as shown in Figs. 1 and 2. The dry flexural strength is about 58,000 p.s.i. and the wet flexural strength is about 39,000 p.s.i. In compression, the strength drops from 35,000 p.s.i. dry to 18,000 p.s.i. wet. The specifications that the Air Force places on such a material would of necessity have to take these wet values into consideration. The Materials Laboratory, Wright Air Development Center, has stated that they want to raise the wet strength specification for the ECC-181 laminates to a wet flexural strength of 45,000 p.s.i. and a wet compressive strength of 30,000 p.s.i.

Table I—Properties of Laminates Made With ECC-181-136 Glass Fabric and Six Different Resins*

	Resin A	Resin B	Resin C	Resin D	Resin E	Resin F
Thickness of panel, in.	0.115	0.117	0.124	0.119	0.117	0.114
Specific gravity	1.90	1.90	1.88	1.91	1.91	1.89
Combustibles, % by wt.	30.6	32.2	31.0	30.9	29.8	30.5
Water absorption, %	0.11	0.10	0.10	0.10	0.10	0.21
Flexural strength						
Dry, 10^3 p.s.i.	68.0	73.5	68.9	59.2	65.2	60.0
After 2-hr. boil, 10^3 p.s.i.	61.3	61.9	59.0	50.5	56.2	54.0
Flexural modulus of elasticity						
Dry, 10^6 p.s.i.	3.94	3.95	3.40	3.40	3.61	4.32
After 2-hr. boil, 10^6 p.s.i.	3.76	3.71	3.84	3.85	3.83	3.85
Compressive strength						
Dry, 10^3 p.s.i.	41.4	47.2	38.3	36.7	41.1	30.7
After 2-hr. boil, 10^3 p.s.i.	40.1	40.8	36.9	30.6	35.8	30.1
Tensile strength, 10^3 p.s.i.	50.1	49.7	49.0	47.1	43.2	39.5
Tensile modulus of elasticity, 10^6 p.s.i.	3.70	3.75	3.56	3.36	3.75	3.49
Impact strength, edgewise, unnotched, ft.-lb/in. width	25.5	22.0	22.7	23.2	17.7	17.1

*Results shown are averages for 5 test specimens

Prior to 1950, the Owens-Corning Fiberglas Corp. started work with the Cowles Chemical Co., using a water system of their SS2D. Finish 136 was developed as a result of this effort. The flexural and compressive strength properties that can be attained using Finish 136 with several polyester resins are shown in Figs. 1 and 2. Other properties of these laminates are presented in Table I.

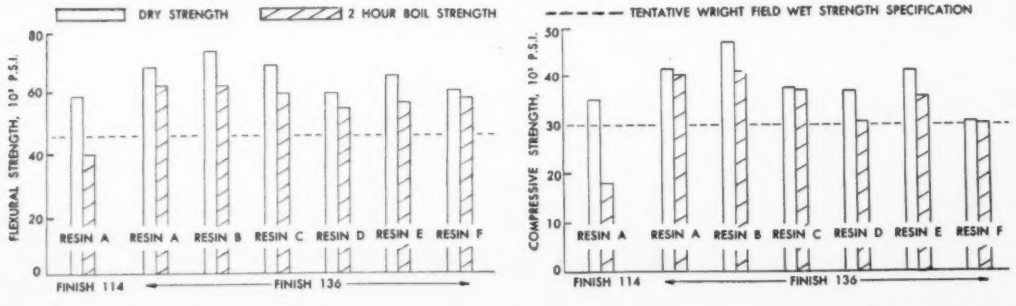
The laminates referred to in this paper were prepared with 13 plies of ECC-181-38 Finish 136. Polyester resins from five different companies were used. The laminates were cured at 250° F. for 30 minutes. Spacers maintained uniform resin content.

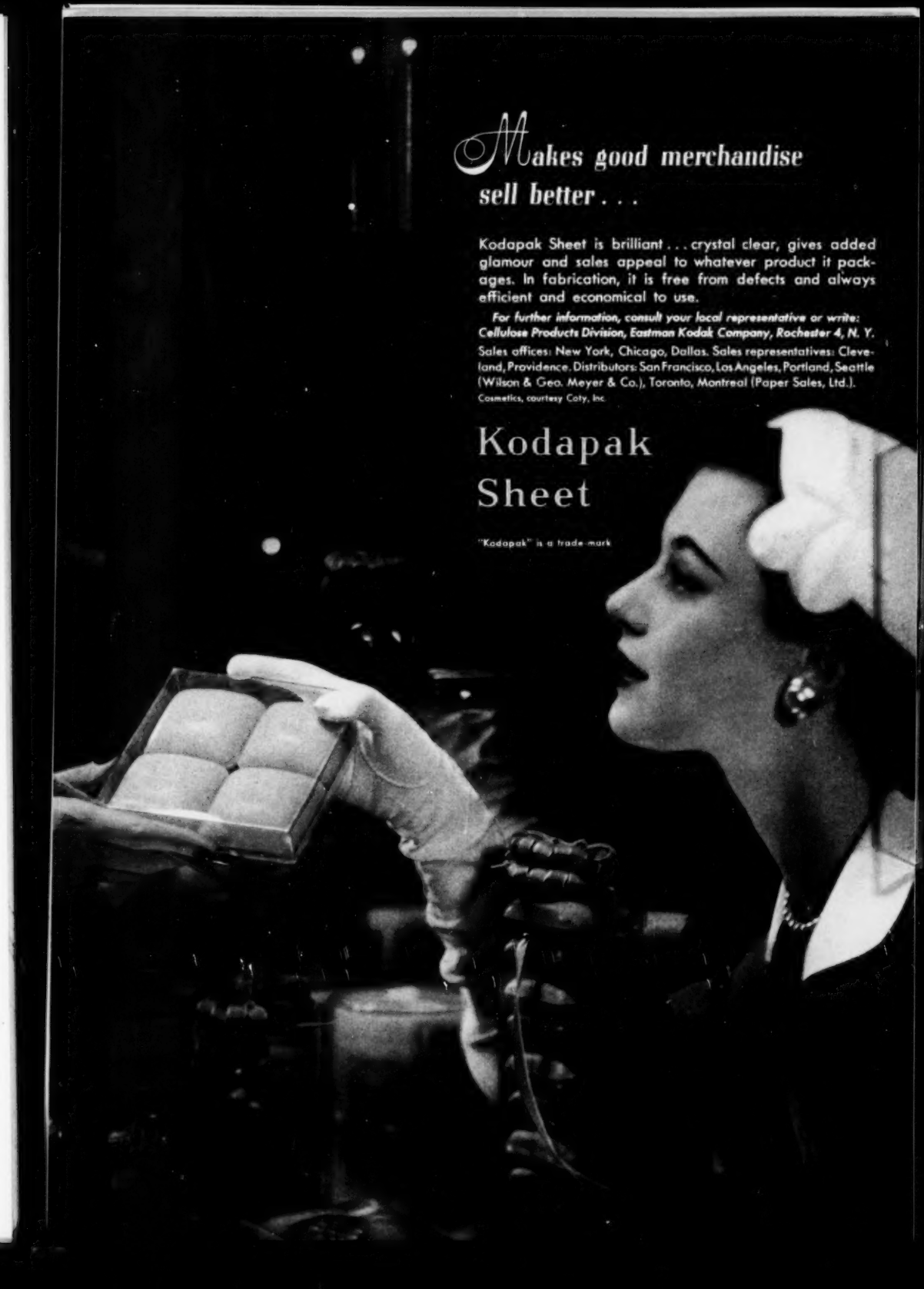
Further field checks are being made to determine the effectiveness of Finish 136 with phenolic, silicone, melamine, and epoxy resins. The ingredients in Finish 136 are being incorporated experimentally in the sizing, which is applied to the glass as it is formed. This produces an improvement parallel to that which is experienced using ECC-181 fabric. Finish 136 is applied from a water system on standard textile treating equipment.

Other improved finishes are under study to improve not only wet strength retention but also dry strength values. Several experimental materials show great promise.

† Product Development Laboratories, Owens-Corning Fiberglas Corp.

Figs. 1 and 2—Flexural (left below) and compressive (right below) strengths of ECC-181-136 fabric laminates made with six different resins

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Properties

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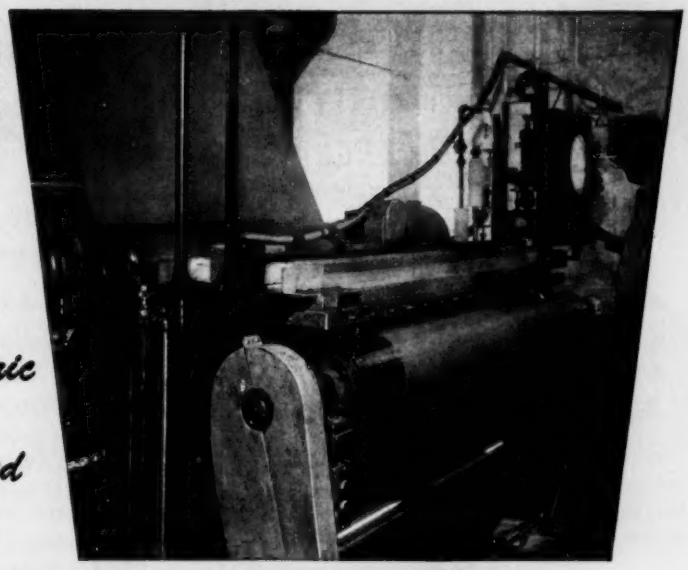
Embossing of vinyl-coated fabric with Butterworth 2-Roll Embossing Machine using an electrically heated plate for conditioning the vinyl. Starting with a friction let-off at entering end, fabric passes around double-jacketed steel cylinder, under electrically heated plate, through the embossing rolls, over cooling cylinders to double slip disc winder. Photograph courtesy of Landers Corp., Toledo, Ohio.



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Better Embossing *either way*

If embossing is part of your finishing process — on coated fabric or unsupported film — it will pay you to get the facts on the Butterworth 2-Roll Embossing Machine.

On coated fabrics: for deep designs the top engraved roll and a felt paper roll are geared together; for medium designs the bottom roll is rubber and patterns are changed merely by removing the engraved roll. Top engraved roll is steam-heated for deep designs, water-cooled for medium designs.

On unsupported film: where the bottom roll is rubber-covered a special lever arm with removable cap permits quick change of patterns without removing the arm. This lever arm somewhat limits the pressure which can be maintained, but deep designs can be accomplished with minimum pressure where the proper heat-treating arrangement is used. For light films such as 4-millimeter, a much lighter embossing calender should be used.

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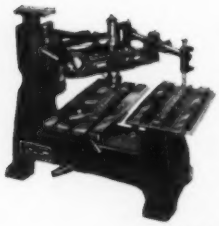

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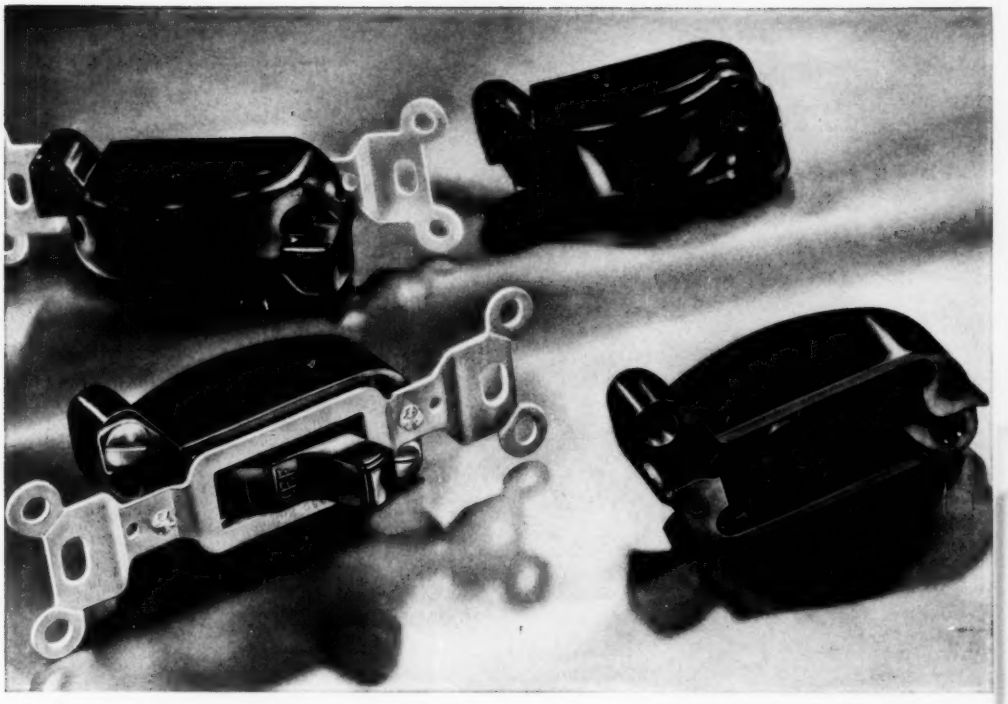
bursting strength of materials with high elongation can be avoided by using a circular test specimen and clamping it into a bell-shaped attachment. The bell was attached to an ordinary Schopper-Dalen bursting apparatus. Results are given.

Testing

INTERLABORATORY STUDY ON DETERMINATION OF ACETYL IN CELLULOSE ACETATE. Anal. Chem. *24*, 400-03, (Feb. 1952). This is a progress report by Sub-committee on Acetyl Analysis, ACS Division of Cellulose Chemistry Committee on Standards and Methods of Testing. Eberstadt method, as now used for the determination of acetyl in cellulose acetate, was investigated by an interlaboratory study. Two samples of commercial cellulose acetate were analyzed by 9 laboratories, and in each laboratory 2 analysts analyzed each sample in duplicate on 3 different days. The results, which are a measure of the performance of this method in practical use, show that the agreement between duplicates is good, the precision of the various operators and within the various laboratories is generally satisfactory, but the agreement between laboratories leaves much to be desired. This method is offered as a tentative standard for the determination of acetyl in cellulose acetate.

INFRA-RED DETERMINATION OF FREE PHENOL IN PHENOL-FORMALDEHYDE RESINS. J. J. Smith, F. M. Rugg, and H. M. Bowman. Anal. Chem. *24*, 497-501 (Mar. 1952). The most commonly employed methods for determining the free phenol content of phenol-formaldehyde resins involve separation of the phenol from the resin by distillation or extraction, operations that are time-consuming and often not quantitative. A rapid infra-red method is based on the 14.4-micron phenol absorption in the spectrum of an acetone solution of the resin sample. The unreacted phenol in both heat-stable (novolac) and heat-reactive (resol) resins can be determined to within $\pm 0.3\%$ of the total sample. This technique can be used to advantage in studying polycondensations of phenol and formaldehyde and the effects of free phenol on properties of phenolic resins.

DETERMINATION OF METHYL METHACRYLATE BY OXIDATIVE TITRATION. S. Dal Nogare, L. R. Perkins, and A. H. Hale. Anal. Chem. *24*, 512-15 (Mar. 1952). In view of the dependence of certain properties of polymethyl methacrylate on its free monomer content, a method was required for the determination of free monomer in polymer. Because the common methods for measuring unsaturation lacked specificity and sensitivity, a new procedure was developed. The method described involves isolation of the monomer by distillation from an acetic acid-water solution of the polymer sample. Monomer is then measured in the distillate by titration with permanganate in the presence of sulfuric and periodic acids. The reactions involved in this oxidative titration are hydroxylations of the double bond with permanganate and cleavage of the resulting diol with periodic acid. The method has proved satisfactory for the analysis of a large variety of polymethyl methacrylate samples, giving a precision of $\pm 5\%$ of the amount of monomer present. In addition, oxidative titration can be used to determine styrene, acrylonitrile, and methyl acrylate in solution.



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U. S. PLASTICS PATENTS

Copies of these patents are available from the U. S. Patent Office, Washington, D. C., at 25¢ each.

POLYMERIZATION. W. J. Sparks and R. M. Thomas (to Jasco). U.S. 2,585,867, Feb. 12. Polymerizing isoolefins with methyl chloride solution of boron trifluoride as catalyst.

EMBOSSING. M. A. Chavannes (to Chavannes Industrial Synthetics). U.S. 2,585,915, Feb. 19. Apparatus for embossing plastic film.

POLYMER COMPOSITIONS. M. R. Dalton (to American Viscose). U.S. 2,585,918, Feb. 19. Solutions of acrylonitrile in nitromethane and formamide.

BINDING AGENTS. L. Schibler (to Ciba). U.S. 2,585,967, Feb. 19. Water-dispersible dry hardenable binders.

POLYMERIZATION. R. S. Robinson (to Reichhold Chemicals). U.S. 2,586,092, Feb. 19. Emulsion copolymerization of styrene with bodied oil or bodied-oil-modified alkyd.

RESIN EMULSIONS. L. Schibler (to Ciba). U.S. 2,586,098, Feb. 19. Stable emulsions of thermosetting resins.

CHLORINATED RUBBER. G. J. Van Amerongen (to Rubber Stichting). U.S. 2,586,124, Feb. 19. Preparation of aqueous dispersions of chlorinated rubber.

FRICTION MATERIALS. H. J. Cofek (to Raybestos-Manhattan). U.S. 2,586,150, Feb. 19. Friction material comprising asbestos, fillers, and phenol-aldehyde resin.

POLYSULFIDES. F. K. Signaigo. U.S. 2,586,182, Feb. 19. Polymeric methoxymethyl - ethylene polysulfide.

COPOLYMERS. M. R. Lytton (to Chemstrand). U.S. 2,586,238, Feb. 19. Copolymers of acrylonitrile and amine oxides.

POLYMERS. B. R. Dishon and F. Goldschmidt. U.S. 2,586,312, Feb. 19. Polyphosphonitrilic esters.

POLYMERIZATION. W. A. Franta (to Du Pont). U.S. 2,586,322, Feb. 19. Controlling chain branching during ethylene polymerization.

EMULSION. J. J. Keyes (to Westinghouse). U.S. 2,586,344, Feb. 19. Phenolic-oil modified alkyd-copal resin emulsions for treating glass fibers.

POLYMERS. W. E. Llewellyn (to Du Pont). U.S. 2,586,357, Feb. 19. Suspension of tetrafluoroethylene polymer colloidal particles in a hydrocarbon.

POLYMERS. A. McAlevy (to Du Pont). U.S. 2,586,363, Feb. 19. Vulcanizable chlorosulfonated polymers of ethylene and copolymers thereof.

PHENOLIC RESINS. R. H. Runk (to Westinghouse). U.S. 2,586,385, Feb. 19. Oil-soluble phenolic resin varnishes.

POLYMERIZATION. W. T. Miller, A. L. Dittman, and S. K. Reed (to U.S.). U.S. 2,586,550, Feb. 19. Halogen-substituted acetyl peroxide catalyst for polymerization of halo-olefins.

STYRENE COPOLYMERS, J. J. Sleightholme and W. T. Hammond (to Sherwin-Williams). U.S. 2,586,571-2, Feb. 19. Copolymerizates of styrene and unsaturated lubricating oil fractions.

FILM CASTING. M. E. Wendt (to Wingfoot). U.S. 2,586,587, Feb. 19. Casting a film of heat activated adhesive on an endless belt of polyethylene.

INTERPOLYMERS. F. Armitage and J. J. Sleightholme (to Sherwin-Williams). U.S. 2,586,593, Feb. 19. Interpolymers of styrene with unsaturated fatty acids and esters thereof.

CELLULOSE ACETATE. E. F. Evans (to Hercules). U.S. 2,586,633, Feb. 19. Preparation of cellulose triacetate using boron trifluoride as a catalyst.

COPOLYMERS. D. H. Hewitt, F. Armitage (to Sherwin-Williams). U.S. 2,586,652, Feb. 19. Interpolymers of styrene with polyhydric alcoholic mixed esters.

ION EXCHANGE. A. V. Alm (to American Cyanamid). U.S. 2,586,-770, Feb. 26. Ion exchange resins from epichlorohydrin-alkylene polyamine reaction.

CLOSURE. J. A. Benner and J. M. Sharf (to Armstrong Cork). U.S. 2,586,775, Feb. 26. Polyethylene container closure.

FILM. W. F. Hemperly and N. R. Smith (to Carbide and Carbon). U.S. 2,586,820, Feb. 26. Manufacture of polyethylene film.

POLYMERIZATION. J. C. Morrell. U.S. 2,586,852, Feb. 26. Kaolin-phosphoric acid catalyst for polymerizing olefins.

ION EXCHANGE. G. R. Stroh (to American Cyanamid). U.S. 2,586,-882-3, Feb. 26. Alkylene polyamine-epichlorohydrin resin reaction products as ion exchange resin.

COPOLYMERS. A. D. F. Toy and L. V. Brown (to Victor Chemical). U.S. 2,586,884-5. Feb. 26. Copolymers of di-beta, gamma unsaturated alkenyl alpha, beta unsaturated alkenyl-phosphonates with unsaturated alkyd resins.

BLOWING AGENTS. G. Van Gaver (to Societe Anonyme des Manufactures des Glaces et Produits Chimiques). U.S. 2,586,887, Feb. 26. Benzilmono-hydrazon blowing agent for thermoplastic foams.

POLYMERIZATION. F. Rosenthal (to R.C.A). U.S. 2,586,996, Feb. 26. Preparation of polymerizable nonpolar substances.

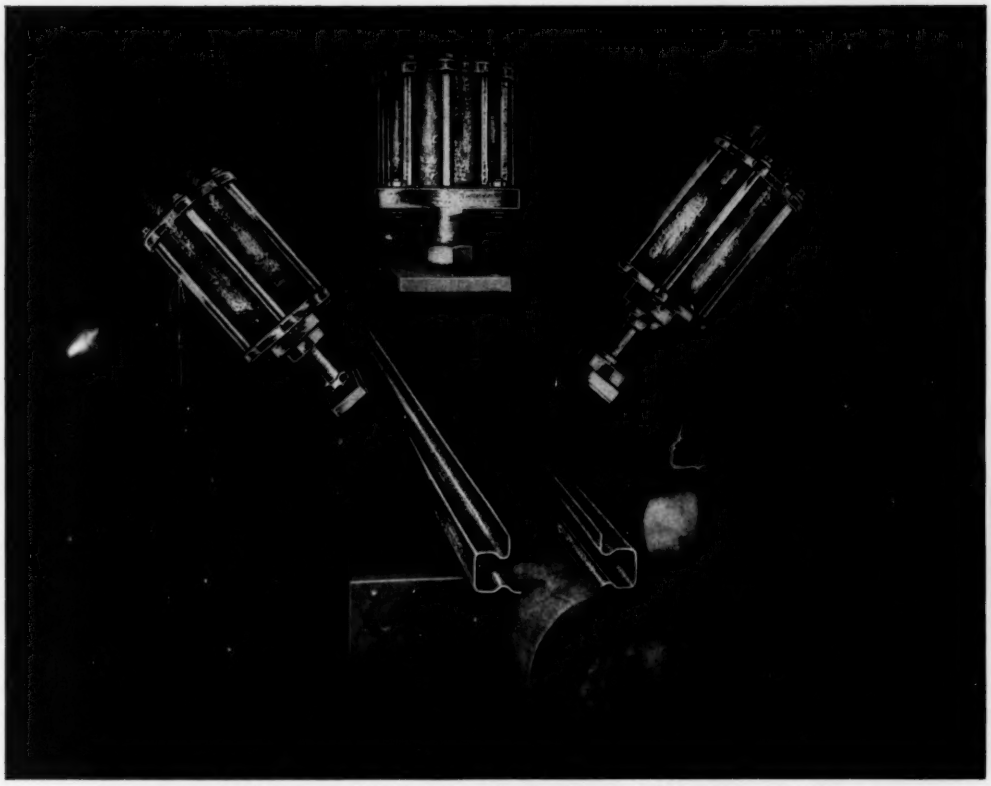
MOLDING. K. W. Spillman. U.S. 2,-587,070, Feb. 26. Multiple molding by injection of thermoplastic resins.

LAMINATE. N. W. Knewstubb and C. N. Jenkins (to Carbide and Carbon). U.S. 2,587,171, Feb. 26. Resin bonded fibrous sheet laminates.

RESINS. C. D. Doyle and H. C. Nelson, Jr. (to G.E.). U.S. 2,587,295, Feb. 26. Alkyd-polysiloxane resins.

COPOLYMERS. E. J. Carlson (to Goodrich). U.S. 2,587,442, Feb. 26. Copolymers of maleic anhydride with allyl esters of alkylidene-bis-aromatic carbonates.

FIBER SPINNING. G. E. Haur (to



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Monsanto). U.S. 2,587,464, Feb. 26. Spinning fibers from solutions of vinylidene chloride polymers in tris (N,N-di-methylamino) phosphine oxide.

POLYMERS. G. E. Ham and E. C. Chapin (to Monsanto). U.S. 2,587,-465, Feb. 26. Solution polymerization of acrylonitrile in aqueous alcohol.

COATING. P. E. Marling (to Monsanto). U.S. 2,587,497, Feb. 27. Coating containing vinyl tall oil esters.

POLYSTRENE. Q. A. Trementozzi (to Monsanto). U.S. 2,587,549, Feb. 27. Polystyrenes stabilized with organo amidophosphates.

POLYMERS. J. C. Westfahl and D. S. Sears (to Goodrich). U.S. 2,587,558, Feb. 26. Polymers of 2-carboalkoxy-1,3-butadienes.

POLYMERIZATION. W. K. Wilson (to Shawinigan). U.S. 2,587,562, Feb. 26. Continuous emulsion polymerization of vinyl acetate.

PHENOLIC RESINS. J. L. Jones (to Libbey-Owens-Ford). U.S. 2,587,-578, Mar. 4. Preparation of light colored oil soluble phenolic resins by reacting in the presence of a zinc organic salt.

STRUCTURAL MATERIAL. H. S. Busby and W. L. Ward (to U.S.). U.S. 2,-587,591, Mar. 4. Copolymerizing vinyl acetate and an unsaturated polyester in the presence of cotton fiber.

DECORATIVE SHEET. M. A. Chavannes and L. E. Magoon (to Chavannes Industrial Synthetics). U.S. 2,-587,594, Mar. 4. Vinyl film having a two-toned irregular surface.

COPOLYMERIZATION. R. B. Thompson and H. S. Bloch (to Universal Oil). U.S. 2,587,791, Mar. 4. Copolymers of aromatic fulvenes and olefins.

PLASTICS. L. Akobjanoff. U.S. 2,-587,805, Mar. 4. Arsenic-modified polysulfide plastics.

FIBROUS PREFORM. G. W. Borkland (to Owens-Corning Fiberglas). U.S. 2,587,814, Mar. 4. Method and apparatus for making fibrous glass preforms.

MOLDING. C. Uschmann (to Cascades Plywood). U.S. 2,587,930, Mar. 4. Extruding a mixture of wood fibers and thermosetting binder.

FOAMED RESINS. J. D. Nelson, J. J. Pyle, and J. W. Underwood (to General Electric). U.S. 2,588,151, Mar. 4. Apparatus for forming cellular molded phenolic resin parts.

POLYETHYLENE. R. C. Danison (to Diamond Alkali). U.S. 2,588,362, Mar. 11. Flame retardant polyethylene-lignin composition.

ACRYLIC POLYMERS. W. C. Mast and C. H. Fisher (to U.S.). U.S. 2,-588,398, Mar. 11. Granular polymers of alkyl acrylates.

CELLULOSE ESTERS. J. J. Allen and J. A. Hawkes (to Celanese). U.S. 2,588,457, Mar. 11. Preparation of cellulose acetate-stearate.

VINYL POLYMERS. H. M. Gamrath and W. E. Weesner (to Monsanto), U.S. 2,588,512, Mar. 11. Vinyl chloride polymers plasticized with alkyl benzyl tetrachlorophthalates.

CONTAINERS. W. K. Archer (to Injection Molding). U.S. 2,588,604, Mar. 11. Method of sealing hollow plastic containers.

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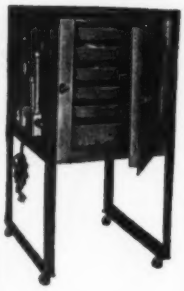

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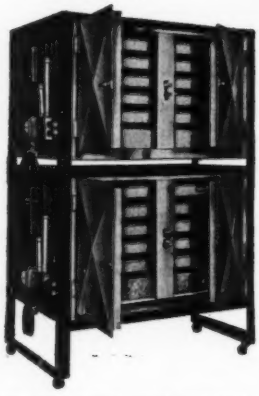

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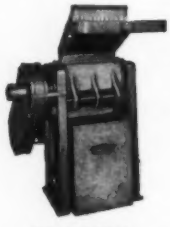

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TELEPHONE BARCLAY 7-3600

Roche and R. M. Price (to Dow). U.S. 2,588,660, Mar. 11. Molding composition comprising a vinyl aromatic resin and a polyethylene glycol.

MOLDING. G. B. Sayre (to Boonton Molding). U.S. 2,588,662, Mar. 11. Automatic control for molding presses.

ION EXCHANGE. D. Whittaker and G. G. Allen (to Imperial Chemical). U.S. 2,588,784, Mar. 11. Alkylene polyamine meta-phenylene diamine formaldehyde acetone ion exchange resins.

DRYING OILS. R. C. Goodwin (to Phillips Petroleum). U.S. 2,588,826, Mar. 11. Manufacture of improved drying oils by condensation of unsaturated mineral oil polymers with aldehydes.

COATINGS. N. S. Greiner (to Johns-Manville). U.S. 2,588,828, Mar. 11. Heat polymerizable alkyl-aryl siloxane compositions as coatings for cements.

EXPANDED PLASTICS. R. L. Schlessinger (to U.S. Rubber). U.S. 2,588,885, Mar. 11. Organic plastics expanded with aryl azo sulfones.

COPOLYMERS. E. C. Shokal and P. A. Devlin (to Shell Development). U.S. 2,588,890, Mar. 11. Allyl alcohol-styrene copolymers.

CONTAINERS. L. R. Page, Jr. and J. P. Croasdale, Jr. (to Robert Gair). U.S. 2,589,022, Mar. 11. Apparatus and method for making plastic folding containers.

RESINS. H. W. Coover, Jr. and J. B. Dickey (to Eastman Kodak). U.S. 2,589,055, Mar. 11. Mixtures of polyacrylonitrile and polyalkyl alpha-acylaminoacrylates.

PHENOLIC RESINS. M. DeGroote and B. Keiser (to Petrolite). U.S. 2,589,061-2, Mar. 11. Oxyalkylated derivatives of furfural-substituted phenolic resins.

RESINS. E. V. Fasce (to Standard Oil). U.S. 2,589,069, Mar. 11. Resins from olefin polymers and organic acid anhydride.

POLYMERS. G. Serniuk (to Standard Oil). U.S. 2,589,151, Mar. 11. Thioglycolic adducts of rubberlike polymers.

COPOLYMER. B. M. Vanderbilt and F. Bascom (to Standard Oil). U.S.

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2,589,166, Mar. 11. Ketone-soluble copolymer of methacrylonitrile and a. diolefin.

POLYMERS. O. Kardos (to Hanson-Van Winkle-Munning). U.S. 2,589,-209, Mar. 18. Dithiocarbamate-aldehyde condensates.

ACYLATION. J. F. Carson (to U.S.). U.S. 2,589,226, Mar. 18. Acylation of polysaccharides in formamide.

COPOLYMERS. E. K. Ellingboe (to Du Pont). U.S. 2,589,237, Mar. 18. Copolymers of vinyl chloride and allylglycidyl ether.

COPOLYMERS. J. T. Goodwin, Jr. and M. J. Hunter (to Dow Corning). U.S. 2,589,243, Mar. 18. Modified siloxane-alkyd copolymers.

RESINS. S. O. Greenlee (to Devoe and Raynolds). U.S. 2,589,245, Mar. 18. Amide-epoxide compositions.

CATALYSTS. E. G. Howard, Jr. (to Du Pont). U.S. 2,589,258, Mar. 18. Hydrazobisalkane-sulfonate polymerization catalyst.

RESIN. P. H. Rhodes (to Koppers). U.S. 2,589,286, Mar. 18. Dimensionally stable hardened copolymeric phenol-resorcinol-aldehyde resin.

POLYMERS. R. F. Schmidt, A. E. Ardis, and H. Gilbert (to Goodrich). U.S. 2,589,294, Mar. 18. Vinylidene cyanide polymers.

PLASTIC HEATING. E. Mittlemann (to H. Jenett). U.S. 2,589,417, Mar. 18. Apparatus for heating and mixing plastic compositions with radio frequency energy.

CORE MATERIAL. V. H. Turkington and L. Schechter (to Carbide and Carbon). U.S. 2,589,459, Mar. 18. Curable core material of resinous polyester.

LAMINATE. J. M. Lurie (to Bonafide Mills). U.S. 2,589,502, Mar. 18. Laminated sheet for use as a covering for floors or walls.

FOAMED PLASTICS. P. J. Carpentier. U.S. 2,589,537, Mar. 18. Generating gases within plastics with phthalic anhydride and calcium carbonate.

COATING. M. H. Nickerson (to De-Bell and Richarsdon). U.S. 2,589,567, Mar. 18. Melamine-formaldehyde scratch resistant coating.

ABRASIVE. H. V. Allison (to Allison). U.S. 2,589,652, Mar. 18. Abrasive comprising backing, a condensate of dimethyl terephthalate, pentaerythritol, methoxy polyglycol, and lead dioxide.

INTERPOLYMERS. F. Armitage and E. S. J. Fry (to Sherwin-Williams). U.S. 2,589,655, Mar. 18. Interpolymers of drying oils, alkyd resin, and an acenaphthylene compound.

RESIN. L. Auer, U.S. 2,589,657, Mar. 18. Modified short oil alkyd resins.

RESINS. A. P. Dunlop and P. R. Stout (to Quaker Oats). U.S. 2,589,-683, Mar. 18. Furfuryl alcohol-ammonium thiocyanate-aldehyde resins.

POLYESTERS. P. J. Flory and F. S. Leutner (to Wingfoot), U.S. 2,589,-687, Mar. 18. Method of preparing linear polyesters.

SEALING DEVICE. H. B. Silver (to Plastic Seal). U.S. 2,589,740, Mar. 18. Container sealing machine.

SEALING APPARATUS. F. V. Collins (to Wm. F. Stahl). U.S. 2,589,777, Mar. 18. Plastic sealing apparatus.

MOLDING. H. C. Engel, R. Raab,

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Polyethylene Sheets

Compression molded thermoplastic sheet users now have available larger sizes of Acadia polyethylene. These are available in the new size of 36" x 36" x 1/16".

Standard sizes are furnished in 20" x 20" from 1/32" to 1" thick and 24" x 24" from 1/16" to 1/2" thick. Special sizes are also available. Polystyrene, Tenite, Saran, Vinylite, Geon, Ethyl-Cellulose and Styralloy sheets can be compression molded in most of the above sizes. Wire or write for specifications.

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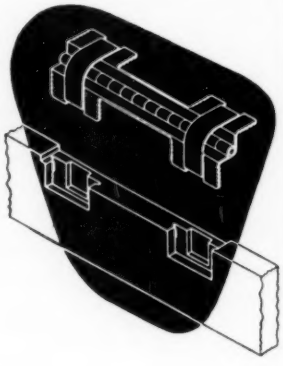


GEISSEL *Mfg. Co., Inc.*

109 LONG AVENUE
HILLSIDE, N. J., U. S. A.

and T. Pajak (to Glenn L. Martin). U.S. 2,589,786, Mar. 18. Method of forming hollow plastic bodies.

MOLDING COMPOSITIONS. E. Hene (to Usewood). U.S. 2,589,941, Mar. 18. Molding compositions from cellulose, formaldehyde, hydrocarbon, and alkali.

FLOOR COVERINGS. R. K. Petry (to Congoleum-Nairn). U.S. 2,590,032, Mar. 18. Vinyl laminated floor and wall coverings.

HIGH MOLECULAR MATERIALS. D. E. Winkler (to Shell Development). U.S. 2,590,059, Mar. 18. High molecular weight halogenated materials stabilized with a mixture of an epoxy compound and a carboxylic acid salt.

CELLULAR PLASTICS. P. J. Carpentier. U.S. 2,590,156, Mar. 25. Molding a miniature shape of expandable thermoplastic and expanding.

MOLDING COMPOSITIONS. G. F. Rugar (to Diamond Alkali). U.S. 2,590,211, Mar. 25. Flameproof thermoplastic molding compositions.

ION EXCHANGE. J. A. Otto (to Allied Chemical). U.S. 2,590,449, Mar. 25. Cation-exchange acetaldehyde disulfonic acid-phenol condensate.

SHEET MATERIAL. L. J. Berberich and O. E. Anderson (to Westinghouse). U.S. 2,590,493, Mar. 25. Sheet of glass fibers bonded with polymerizable phenyl methyl polysiloxane.

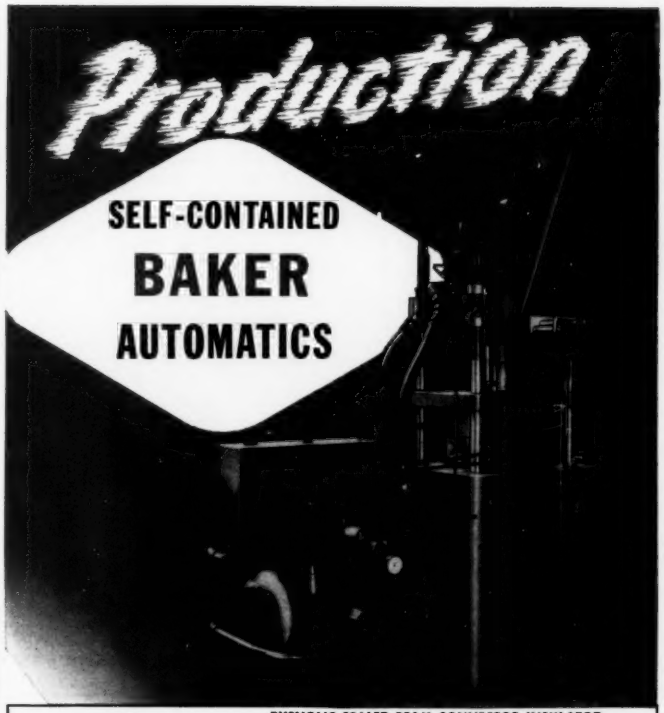
POLYVINYL CHLORIDE. D. S. Rosenberg (to Hooker). U.S. 2,590,651, Mar. 25, Process for after-chlorination of polyvinyl chloride, with chlorine in the presence of actinic radiation.

ALKYD RESINS. A. F. Schmutzler (to American Cyanamid). U.S. 2,590,653-4, Mar. 25. Tall oil modified alkyd resins and printing inks prepared therefrom.

COPOLYMERS. F. A. Yeoman (to Westinghouse). U.S. 2,590,668, Mar. 25. Castor-oil-unsaturated dicarboxylic acid copolymer resins.

RESIN. V. Da Veiga. U.S. 2,590,760, Mar. 25. Resin made from tannin, sulfuric acid, acetone, and potassium cyanide.

POLYMERIZATION. T. E. Jordan and E. L. Cline (to Allied Chemical).



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8 CAVITIES . . . 640 PIECES PER HOUR

The Wade Electric Products Company of Sturgis, Michigan, supplies this part as original equipment to several of the major automobile manufacturers. Molded by Seneca Plastics Inc., of Cambridge, Ohio, using an 8 cavity mold on the Baker 30 Ton Automatic Compression Molding Machine, cure time of 34 seconds, plus machine cycle time of 11 seconds, gives total cycle time of 45 seconds, or 640 parts finished per hour.

Mr. Dick Wade, General Manager of Seneca Plastics of Cambridge, Ohio says . . . "The Baker Automatic exceeded my best expectations by over 40%, because of the tremendously fast machine cycle time, and completely automatic operation. Its ability to load, close, breathe, open, eject, and air blast clean, all in 11 seconds, plus the actual cure time, put the Baker in a class by itself. This, combined with its versatility in alkyds, and all other conventional thermosets, makes the Baker a must in our operation."

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Baker Brothers invite comparison of their closure speed of 400 inches per minute, their large platen area and overall Alkyd cycle time of 4 seconds plus cure, or the phenolic cycle time of 12 seconds plus cure with any other machine on the market. Actual records of specific parts show the Baker Automatic to be capable of multiplying production by as much as four times, and with lower initial investment due to the fewer die cavities required. The machine is available from stock in both 15 ton and 30 ton models with 8 cavity feeder. Floor area 56″ x 25″ for either model. Send for details . . . now!

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83 WATER STREET, LEOMINSTER, MASS.
Outfitters to Plastics Mfrs. Since 1911

OMNI PRODUCTS CORP., Export Distributors, New York, N. Y.

U.S. 2,590,771, Mar. 25. Polymerization of paracoumarone in the presence of stannic chloride.

ELECTRICAL ASSEMBLY. J. L. Kiser (to Melpar). U.S. 2,590,821, Mar. 25. Electrical assembly potted in plastic material.

POLYVINYL CHLORIDE. D. Faulkner and J. J. P. Staudinger (to Distillers). U.S. 2,590,834, Apr. 1. Vinylidene chloride which is plasticized with low molecular weight styrene polymers.

PLASTICIZERS. M. L. Fein and C. H. Fisher (to U.S.). U.S. 2,590,852, Apr. 1. Polyvinyl chloride-acetate resins plasticized with esters of acylated 'actic acid.

RESINS. H. A. Clark (to Dow Corning). U.S. 2,590,937, Apr. 1. Organosilicon copolymer resin.

ORGANOSILICON RESINS. J. T. Goodwin, Jr. (to Dow Corning). U.S. 2,590,957, Apr. 1. Organosilicon copolymer resin.

POLYMERS. A. E. Smith (to U. S.). U. S. 2,591,020, Apr. 1. Allylated trimethylene trisulfones polymers.

CELLULOSE ACETATE. B. T. Lamborn (to Hercules). U. S. 2,591,077, Apr. 1. Cellulose acetate molding composition.

GUANIDE-FORMALDEHYDE. J. T. Thurston (to American Cyanamid). U. S. 2,591,218, Apr. 1. Guanide-formaldehyde condensates for tanning and bleaching leather.

SHEET EMBOSSING. M. W. Ditto and R. H. Hugger (to Cordo Chemical). U. S. 2,591,240, Apr. 1. Apparatus for producing an embossed coating on sheet material.

FILAMENTS. J. T. Hackmann (to Shell Development). U. S. 2,591,254, Apr. 1. Production of rubber polymer-sulfur dioxide filaments.

PRODUCTION OF RODS. W. Schuller. U.S. 2,591,304, Apr. 1. Device for producing rods and tubes from glass, plastic, or the like.

Patented Boning

The boning material described on p. 173 of our June 1952 issue, known under the trade name of Bonar and produced by Anchor Plastics Co., is covered by patent number 2,531,234; other patents are reported to be pending on certain improvements.

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MOSLO DUPLIMATIC MINIJECTOR—especially for insert molding of cord-plugs, switch parts, etc. A two-sided self-positioning lower mold section allows operator to remove finished molded part from the mold section and refill with new inserts while the other mold section is in cycle. Automatic hydraulic operation provides for complete operator safety. Mold casting area 40 square inches. Injection pressure 20,000 p.s.i. Injection capacity to 4 oz.

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¾ Oz. Hand and Hydraulic
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NEW MACHINERY AND EQUIPMENT

HYDRAULIC MOLDING PRESS—The line of hydraulic slab-side molding presses manufactured by Stewart Bolling & Co., Inc., 3190 E. 65 St., Cleveland 27, Ohio, has been extended by adding a 48 by 48 in. unit with a 36 in. ram. The capacity pressure is 1000 tons. This type of press is especially useful for slab-sole work and for the polishing of sheet material.

SPRAY PAINTING AND MASKING MACHINE—A fully automatic spray painting and masking machine is now being produced by Finish Engineering Co., Inc. 1115 Cherry St., Erie, Pa. The machine sprays up to four different colors in one loading as fast as the operator can load. Production rates of 50 pieces per min. have been attained on test runs. Masks are automatically washed after each spray, which means a steady production at the rate of 3000 or more pieces per hr., since no time is lost in mask cleaning. Changing masks for a different set-up is accomplished in a matter of minutes.

Spray painting machine sprays up to four different colors in one loading

The machine is operated by an air motor and the mask washing is accomplished by turbulent circulation of solvent using an impellor powered by a ⅓ hp. explosion-proof motor. Controls are grouped on a central panel within easy reach of the operator.

FIBER GLASS PREFORMER AND ROVINGS CUTTER—Designed for the purpose of transforming standard fiber glass rovings into uniformly matted preforms for reinforced plastics molding, a new unit (Model No. 103) has been announced by Williams and Associates, 516 Northwood St., Houston 9, Texas. Among the advantages claimed for the machine are a short preform cycle, permitting greater production efficiency; location of all necessary controls and switches in a panel for economical operation; and minimum floor space requirements. Specifications include: preforms per cycle, 1 or more; exhaust fan capacity, 12,000-15,000 c.f.m.; turntable opening (ID), 38 in.; height, 11 ft., 3 in.; floor space, approx. 40 sq. ft.; and weight, approx. 3000 pounds.

Also available from the company are two fiber glass rovings cutters. Both models offer a selective range in cut strand length and speed of operation. Similar specifications for the two include capacity, 1 to 10 strands; size, 25 in. long, 11 in. wide, and 15¾ in. deep. Model 4-52, however, gives a strand length of ⅝ to 8 in. and weighs 92½ lb.; model 3-52 gives a length of ½ to 2 in. and weighs 78 pounds.

BARREL-TYPE PRESS—Intended for use in molding close-tolerance items, a new barrel press has been designed by Adamson United Co., 730 Carroll St., Akron, Ohio, for providing maximum pressure and minimum deflection. The press has circular side plates that conform to the shape of the hydraulic press head and are machined to assure accurate fit between component parts. The curved construction of the side plates contributes to increased rigidity of the press. Top and bottom register plates hold the strain members or side plates to the cylinder and press head. These plates are also machined to conform to the outside machined surface of the members to which they are attached and are designed to afford accurate guiding of bolster and platens.

The ram diameters can be made the same as the width of the platens, thus affording a higher platen pressure. The barrel press is also being used in transfer molding.

Sizes available range from single and duplex laboratory units with 12 by 12 in. platens to medium-size units with 32 by 32 in. platens.

VISCOSITY MEASUREMENT—An instrument for continuous, automatic viscosity measurement using ultrasonics, has been announced by the Rich-Roth Laboratories, 673 Connecticut Blvd., East Hartford 8, Conn. The device, called the Ultra-Viscoson, consists of a probe and an electronic computer. Viscosity is determined by the use of ultrasonic waves applied to the probe. The electronic computer converts the probe output instantly into viscosity measurements on meter, recorder, or controller.

The probe is the size of a fountain pen, with no moving parts, and can operate to 650° F., 10,000 atmospheres pressure. It is installed permanently in pipe lines or production kettles, or used in test tubes and beakers. The electronic computer, located up to 1 mile from probe, indicates viscosity of Newtonian materials from 0 to 50,000 centipoises x g. per cc. in 4 decades—0/50/500/5000/50,000. Apparent viscosity of non-Newtonian materials is measured over a much greater range.

"POCKET SIZE" MOLDING MACHINE—Especially developed for filling a need in small-piece production on a semi- or fully-automatic basis, a new 1 oz. injection molding machine is being displayed by R. H. Windsor, Ltd., Chessington, Surrey, England. The machine is based on the retraction unit system, giving easy access to the sprue bushing and material cylinder. All hydraulic pistons are of piston ring design and require little or no maintenance. In addition, the control gear for operating the machine is completely mechanical.

On a dry run, 420 shots per hr.

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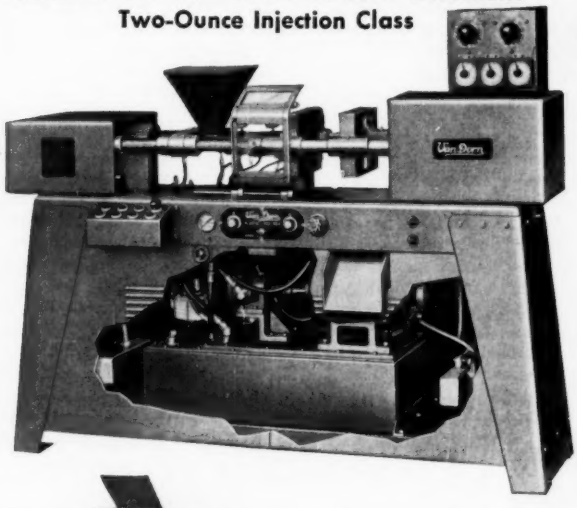
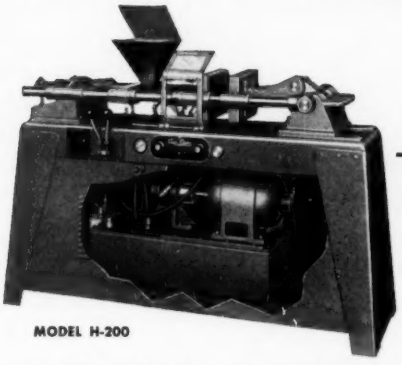
VAN DORN Equipment

Model H-200—Leader in the Semi-Automatic Two-Ounce Injection Class



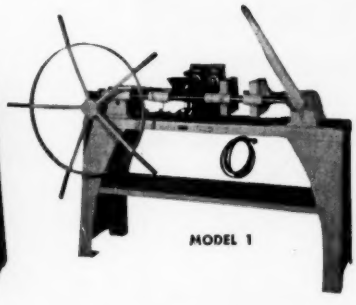
This ultra-modern press molds practically all thermoplastics including nylon. It completes up to 6 operating cycles per minute. Push button controls are safe, simple and convenient. Compact and rugged, the unit is quiet and economical in operation. Sliding gate with interlocking safety devices starts the cycle. Solenoid valves close the molds. Injection and dwell are controlled by first of three timers on the rear panel. Center timer regulates recharging of heater. The third timer controls the length of the mold close cycle; when time runs out, molds automatically open and parts are ejected. Operator opens safety gate, removes product and then closes gate to begin the next cycle . . . Variable voltage transformers in conjunction with thermostatic units control the temperatures on the two heating zones accurately.



MODEL H-200

Power Operated, Lever Controlled Presses

2-oz. or 1-oz. capacity. These low-cost units operate 8 hours for under a dollar and use inexpensive molds. Can easily be set up in twenty minutes by one man.



MODEL 1

Manually Operated Press

1-oz. capacity. This press is ideal for smaller jobs, experimental work and technical training.

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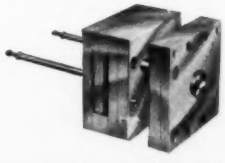
Plastic Grinder

Grinds up rejects, waste, etc., for re-use. Ruggedly made, designed for easy cleaning.



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Available from stock for all Van Dorn presses.

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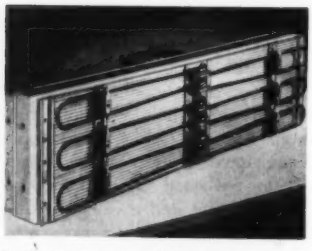
have been recorded. Maximum molded area is between 10 and 12 square inches. Other specifications include plasticizing capacity, 10 lb. per hr.; locking load, 30 tons; pressure exerted 20,000 lb. per sq. in.; and floor space, 96 by 26 inches.

INFRA-RED OVEN PANELS—Pre-engineered infra-red oven panels have been announced by Edwin L. Wiegand Co., 7503 Thomas Blvd., Pittsburgh 8, Pa. The panels—in two modular sizes with built-in bus bars, insulation, and frame—arrive complete and ready to be erected in oven structures and connected to plant wiring. The absorption efficiency of the far-infra-red generator results in very rapid heating, bringing work to temperature quickly, and reducing oven and conveyor lengths. Heat requirements can be accurately selected and can be duplicated whenever desired.



Single pre-engineered infra-red oven panel with electric tubular elements

Included among the panels' features are: 1) Five-ply, built-in thermal insulation, with air space between layers. 2) Built-in bus bars allowing the connection of as many as seven adjacent panels in parallel with only one power supply connection. 3) Airways between the insulation layers, which can be used to preheat air for solvent evaporating applications or other drying uses. 4) Simple assembly features. 5) Chromalox far-infra-red tubular elements, which give an even heating pattern without hot or cold spots.

Two sizes of radiant panels are available—1 by 4 ft., with 10.8 kw. capacity and 2 by 4 ft. with 21.6 kw. capacity. These two modular sizes can be assembled into almost any size oven or rearranged to fit any work size.

GRINDER, SANDER, AND POLISHER—The development of a versatile grinding and polishing unit designed to meet the problems in production of small parts that must be finished off-hand, has been announced by the George F. Grant Co., Inc., West Newton 65, Mass. Employing the contact wheel method of coated abrasive belt polishing, the unit also features platen supported belt grinding, concave and convex contour grinding and polishing.

The grinder is mounted on a steel cabinet base and can be rotated 360° with automatic locking at every 90°. In addition the unit can be set vertically or horizontally.

PYR-O-VANE CONTROLLER—Designed for close control of electrically heated or fuel-fired industrial process equipment such as small heat treating furnaces, plastic extruders, and nylon heat setting equipment, a new time-proportioning indicating millivoltmeter controller has been developed by Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne & Windrim Aves., Philadelphia 44, Pa. The controller is designed to provide straight-line

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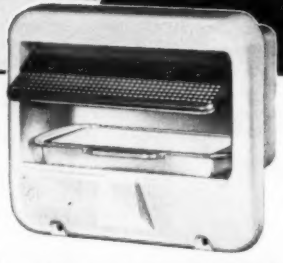

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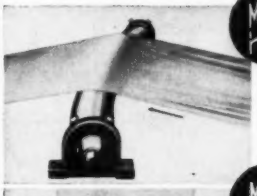

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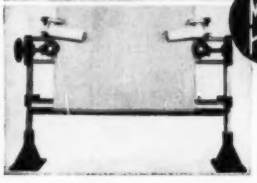
FREE WHEELING EXPANDER

Removes wrinkles and creases before entering next machine. Holds to full width all tire-cord, paper, rubber and plastic films and all types of fabrics.



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2. Mount Hope Skewed Weft Straightener . . . sets weft at right angles to warp.
3. Mount Hope Bowed Weft Straightener . . . takes the curve out of bowed filling.
4. Mount Hope Continuous Roll Feed . . . permits sewing on fresh roll at full machine speed.
5. Mount Hope Plaiter . . . ball bearings—neoprene covered draw rolls.

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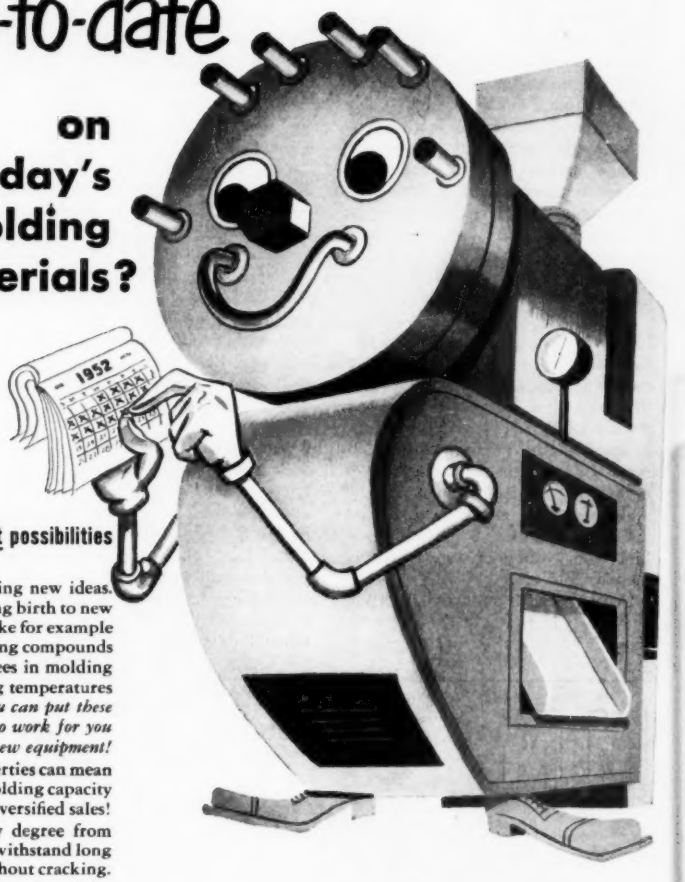
Are you up-to-date on today's molding materials?



Up-to-date thinking can broaden profit possibilities

The plastics business is constantly sprouting new ideas. Improved compounds are giving birth to new products . . . *new profit possibilities.* Take for example VINYLITE Brand Plastics *flexible* molding compounds —now possessing many more degrees in molding temperature limits. Today safe molding temperatures are higher than ever before! *And you can put these better-than-ever materials to work for you without investment in new equipment!*

Think what this impressive list of properties can mean in terms of full utilization of molding capacity . . . diversified sales!

They're **flexible** to almost any degree from soft and rubbery to semi-rigid. They withstand long flexing without cracking.

They're **handsome.** Every color of the rainbow is here . . . in transparent, opaque or translucent form—with a smooth, lustrous finish.

They're **durable** . . . non-fading abrasion-resistant . . . deliver extra long service.

They resist **oil, most chemicals,** corrosive atmospheres, grease, water, alkalies.

They're **adaptable** to high speed injection molding or extrusion.

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Current successful applications for VINYLITE plastic flexible compounds

FLEXIBLE CASE for flashlight, molded in one piece from VINYLITE flexible compounds. Heat-sealed, disposable unit is waterproof, tough, inexpensive. By Hungerford Plastics Corp., Rockaway, N. J.

LONG-WEARING feet, made by J. R. Clark Co. from VINYLITE compounds are for ironing table legs. Non-skid, take rough handling and use. By Minneapolis Plastics Corp., 366 Wacouta St., St. Paul, Minn.

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control unobtainable with two-position or three-position controllers on applications where rapid heating rates, small heating capacity, or abnormal process lags are encountered. The instrument has a variable proportional band between 1 and 3% of full scale. A calibrated feature facilitates the setting and a set of change gears provides a choice of six cycles to meet varied process requirements. The pulse controller has a universal case for flush or surface mounting; a six-in. indicating scale; and plug-in galvanometer and control units.

RELEASE AGENT—Molgard, a new release agent for use as a polyester resin additive, has been formulated by Garan Chemical Corp., 7213 Santa Monica Blvd., Los Angeles 46, Calif., to increase the facility with which molded parts can be produced and removed from matched metal molds. Molgard also reduces the surface tension of polyester resins, resulting in better wetting of the reinforcement and fillers.

The material is an internal parting agent that is added to the polyester resin formulation at the same time that the catalyst, filler, and coloring agents are incorporated in the mix. The active components of Molgard are soluble and compatible with the uncured or liquid polyester resins, but they are not compatible with the cured resin. Consequently, they are squeezed to the surfaces of the molded units.

Tests have shown that Molgard does not affect the bench life of the formulation, the gel or cure time, the weathering characteristics, or the finishing, painting, and adhesive operations. Neither does it discolor the resin nor cause any cracking or crazing of the resin.

Molgard is added in the amount of 1 to 2% of the weight of the polyester resin. It is available in quart, gallon, and five gallon containers.

REFRIGERATING SYSTEM—A self-contained refrigerating unit for the automatic recirculating of cold water or brine has been developed by Mayer Refrigerating Engineers, Inc., Rutherford, N. J., as a low cost, portable unit in the small capacity range for process cooling, laboratory experiments, machine operation, and other industrial requirements. The system, called Junior Chil-er, is also available with a heating element for the recirculation of hot or cold water. The unit consists of an air cooled condenser, condenser motor, recirculating pump, pump motor, insulated recirculating liquid storage tank, thermostatic temperature regulator, and starting switches—all enclosed in a metal housing mounted on rubber tired wheels. No outside water connections are required.

Seven models ranging in capacities from ¼ hp. to 3 hp. with pump capacities from 1 to 10 gpm. are available. The standard temperature range with water is from 38 to 60° F.; with brine, from −10 to +38° F.; with the heating element, from 60 to 140° F.

HYDRAULIC CORE JACK—The hydraulic core jack, manufactured by John Dusenbery Co., Inc., 271 Grove Ave., Verona, N. J., is designed for driving cone type chucks into millroll cores on unwind shafts. The two-ton force of the ram is claimed to drive a cone into the core of a mill roll far more effectively than the impact of a heavy sledge hammer or most types of screw jack arrangements. In addi-

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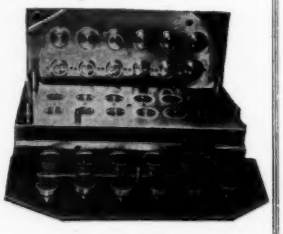

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tion, there are the added advantages of less operator fatigue, shorter time required, and less danger of injury to the equipment. It is also claimed that use of the jack completely eliminates loosening and damage to the mill roll core while unwinding.

The standard Model 560 is available to fit unwind shafts up to 2⅜ in. diameter, but sleeves can be had to adapt one jack assembly for several shaft diameters. The equipment can be clamped in working position with three screws without any modifications of existing unwind shafts.

ROLL COATER, IMPREGNATOR, AND LAMINATOR—A low cost, all-purpose roll coating unit has been developed by the John Waldron Corp., P. O. Box 791, New Brunswick, N. J. The design of the coater permits a wide variety of coating, impregnating, and laminating operations, including application of paint finish to rigid sheets, application of glues to veneer boards, application of laminating adhesives, impregnation of paper and textiles, and application of heat sealing adhesives.

The accurately ground chromium plated steel rolls of the coater are mounted on anti-friction bearings; control of roll adjustment is made by knurled hand wheels.

The coater will handle all types of film forming materials in dispersions, emulsions, or solutions and can be adapted to sheet coating or to continuous web coating of paper, textiles, plastic films, foils, etc.

All-purpose unit permits coating, impregnating, and laminating operations

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BOOKS AND BOOKLETS

Write for these publications to the companies listed. Unless otherwise specified, they will be sent gratis to executives who request them on business stationery.

"British Plastics Year Book—1952"

Published in 1952 by Iliffe & Sons, Ltd., Dorset House, Stamford St., London, S.E.1. 515 pages. Price 30s.

Incorporating the latest revisions and changes, this year book provides a guide to all facets of the plastics industry in the United Kingdom. The book is divided into nine sections: 1) Review of recent patents pertaining to the plastics industry; 2) Classified list of raw materials and the firms producing them; 3) Goods molded and fabricated from plastics materials and a list of the manufacturers' names; 4) Engineering and chemical equipment available for the plastics industry; 5) Proprietary names and technical terms; 6) Names and addresses of firms, associations, research organizations, designers, etc.; 7) Who's who in the plastics industry; 8) Associations and federations; 9) Technical and general data.

"Commercial Directory of Africa."

Published in 1952 by International Marketing Service Corp., Trust Mansions, Sadler St., Nairobi, Kenya Colony. 279 pages. Price 40s.

A complete guide to commercial and industrial enterprises throughout Africa, the main portion of the book is devoted to a classified trade section listing manufacturers, importers and exporters, merchants, etc., together with their addresses. The advertisers are indexed, as well as the trade name headings into which the classified section is divided.

"Tables of Chemical Kinetics, Homogenous Reactions."

Published in 1952 by Government Printing Office, Washington 25, D.C. 731 pages. Price $4.00.

Presented as a cooperative effort on the part of the National Bureau of Standards, the Committee on Table of Constants of the National Research Council, and Princeton University, this compilation offers a critical evaluation of the available numerical data on rates and rate constants of homogenous chemical reactions. Stress is laid throughout on experimentally ascertained facts; data depending on interpretations are generally not included.

"Cross Index to 'Journal of General Chemistry of the U.S.S.R.' (Vol. 20, 1950)."

Published in 1952 by Consultants Bureau, 152 W. 42 St., New York 18, N.Y. Price $5.00.

A comprehensive cross index to the English translation of the *Journal of General Chemistry of the U.S.S.R.*, Vol. 20, 1950, is presented in this book. The four sections cover: 1) titles of papers; 2) author index; 3) subject index; 4) index to organic compounds. References to the pagination of the English translations and to the original Russian are provided.

"Plastics in Building," by Joseph B. Singer.

Published in 1952 by The Architectural Press, 9-13 Queen Annes Gate, S.W.1, London. 192 pages. Price 18s.

A comprehensive survey of the various applications and possible future applications of plastics in the building industry is presented in this book from the standpoint of architects and builders. The book is divided into four sections: 1) A general introduction to plastics, their properties, and the methods of processing them; 2) Plastics for exterior use; 3) Interior applications; and 4) Future possibilities. Although developments in the United States are included, the book is based mainly on the use of plastics in Great Britain.

Dresinate—Used for a wide variety of applications, ranging from an emulsifying agent, detergent additive, dispersant, and foaming and flotating agent to viscosity control and industrial sizing compound, the Dresinate series of sodium and potassium salts of rosins and resins are described in this 12-page technical booklet. The material is available in dry, liquid, or paste form; tabular data list the grades and properties that can be had in each. Tables and text also cover physical and chemical properties of the series, as applied to various industrial purposes. Two special sections in the booklet are devoted to application of the material for emulsifying soluble oils and for extra-action alkaline cleaning compounds. Photographs are used to illustrate the particular effectiveness of the material for both purposes. *Paper Makers Chemical Dept., Hercules Powder Co., Wilmington, Del.*

Synthetic waxes—Synthetic waxes of a wide range of physical properties, including amide and ester types, are described in this 16-page catalog. Tables of specifications are used to illustrate the waxes' divergence in melting points, hardness, color, and insolubility. Also listed is use data for the material in such applications as coatings, lubricants, anti-tack agents, electrical insulants, drawing compounds, flatting agents, release agents, and adhesives. *Glyco Products Co., Inc., 26 Court St., Brooklyn 2, N.Y.*

Electro-formed spray painting masks—Methods of reducing spray painting costs by the use of spray masks are described in this 6-page brochure. The spraying of a molded plastic auto horn button is explained and illustrated through the various stages involved. Also illustrated are the three basic mask classifications—the lip mask for a sunken design; the plug mask where a depressed design is to be kept clean instead of painted; and the block cut-out plane surface mask. A two-page feature describes pressure fixtures and handling devices. *Conforming Matrix Corp., 364 Toledo Factories Bldg., Toledo 2, Ohio.*

Standard mold bases and moldmakers' supplies—Serving not only as a classification of the company's products, but as a handy reference work, this 143-page catalog covers the field of standard mold bases and moldmakers' supplies. The catalog is separated into six different sections—engineering data and price lists on mold bases, retainer sets, and mold plates; stripper plate mold bases; ejector boxes; mold plates and parts; ejector pins; and tools and supplies. Dimension diagrams and photographs are offered for each of the products. Special features of the

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catalog are a pictorial index of bases and supplies, diagrams of typical applications of mold bases; and design data and specifications for plastic molding and die casting machines. *Detroit Mold Engineering Co., 6686 E. McNichols Rd., Detroit 12, Mich.*

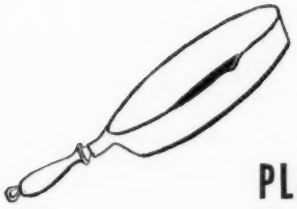
Vacuum—A review of developments in vacuum research and engineering is available in this quarterly magazine entitled *Vacuum*. Each issue contains a synopsis of work done in the field, as well as original papers on subjects of interest to those in the field. A feature of the magazine is a series of abstracts classified by subject and by author. Yearly subscription to the magazine is $4.20. *W. Edwards & Co. Ltd., Worsley Bridge Rd., Lower Sydenham, London, S.E.26.*

Isobutyl alcohol and isobutyl acetate—Comparison of the properties of isobutyl acetate and isobutyl alcohol with their normal butyl homologues in respect to their use in lacquer formulations is offered in this 4-page booklet. The comparisons, which are illustrated with graphs, are based on such characteristics as the relative evaporation rates of the isobutyls versus normal butyl acetate with respect to toluene and V. M. & P. naphtha. A table showing the effect upon viscosity when isobutyl acetate is substituted for normal butyl acetate in solutions containing various resins and polymers is also given. *Tennessee Eastman Co., Kingsport, Tenn.*

Circuit guide—Designed for and offered to those whose work is directly concerned with hydraulic designing, engineering, or circuit application, this kit serves as a reference and work-saving adaptation to circuit diagrams by simplifying planning, making diagrams easier to read or draw, and by saving time. The kit is made up of two units—a drawing template containing basic elements of all Joint Industry Conference symbols and a 32-page booklet in which all key examples of circuit components are represented by symbols approved by the Conference for industrial equipment. Each symbol is accompanied by a reference to the company catalog describing that particular piece. For those not directly involved with industrial hydraulics, the kit is priced at $1.00. *Denison Engineering Co., Columbus, Ohio.*

Plastics for electronics—Of interest to design, engineering, and purchasing personnel, this illustrated folder describes the company's plastic materials, products, and techniques, as well as their facilities for research and development. In the future, as new developments occur, the company intends to send out fillers for insertion in the folder. *Emerson & Cuming Co., 126 Massachusetts Ave., Boston 15, Mass.*

Adjustable spindles and multiple boring heads—The company's line of drilling spindles and multiple cluster drilling attachments are described in this 8-page bulletin (No. 164). This equipment is of use wherever holes must be drilled in multiples in plastic and composition materials of all types. Illustrated are many samples of cluster drilling attachments and examples of how up to 30 holes can be drilled in a panel at one time, with holes on close or extended centers and in regular or irregular pattern. Features of construction, including



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The proved efficiency and compatibility of Santicizers make possible, (a) faster processing, (b) the use of smaller amounts of plasticizer. Not only does the smaller amount of plasticizer improve grease resistance, but Santicizers are, themselves, resistant to extraction by grease and oil. They likewise resist migration of the adhesive used to bond tile and floor.

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cut-away drawings and photographs amplifying important features and explaining adjustments are also given. *B. M. Root Co., York, Pa.*

Nylon-lined bearings—Description of the advantages of nylon as a lining for bearings for rotation or reciprocation is offered in this 4-page bulletin. Five phases are covered—the advantages of nylon as a bearing material; the operating principles of nylon-lined bearings; design limitations solved by nylon-lined bearings; applications; and design and availability. *Thomson Industries, Inc., Manhasset, N.Y.*

Plastisol top coats—Plastisols as top coatings, using plasticizer Staflex KA, are described in this 2-page report. This type of top coat is said to be versatile; for example, it can be applied in thicknesses from one mil up to as high as 40 mils with economic advantages. *Deecy Products Co., 120 Potter St., Cambridge 42, Mass.*

Glass-fiber reinforced alkyds—A series of bulletins is available on the properties and performance of glass-fiber reinforced alkyds. Bulletin A-10 covers the molding of alkyd 440, and includes information on compression molding, transfer molding, and storage. Bulletin A-11 is a data sheet on the properties of alkyd 440. Bulletin A-12 describes the properties of alkyd 442. A 4-page booklet describing and illustrating the various advantages and applications of the material is also available. *Plaskon Div., Libbey-Owens-Ford Glass Co., Toledo 6, Ohio.*

Spark testing tool and die steels—As an aid to tool steel users in quickly and accurately checking the identity of tool and die steels, this 20-page booklet presents a simplified spark test guide. Featured are individual spark diagrams of the thirteen standard tool and die steels with a supplementary description of the detailed spark characteristics for each steel. The booklet also includes instructions for dressing the grinding wheel and preparing the steel sample; information on the effect of wheel speed on spark stream; an explanation of the difference in spark between hardened and annealed steel; and a description of the effect of various elements on the sparks. *The Carpenter Steel Co., General Office, Reading, Pa.*

Far-infrared—Diagrams and photographs are used in this 6-page booklet to explain the advantages of far-infrared radiant heaters, which, because of their longer wave length and ability to emanate in a focussed pattern from a comparatively low heat source, are claimed to be speedier and more efficient than the ordinary heater. The booklet also includes illustrations of the various applications of the heaters, and a set of diagrams and charts covering specifications, controls, and prices. A chart and reprint offering a more technical explanation of the heaters is also available. *Edwin L. Wiegand Co., 7503 Thomas Blvd., Pittsburgh 8, Pa.*

Styrene monomer—Styrene monomer and its derivatives are described in this newly published illustrated booklet. In addition to characteristics and uses for the various styrene derivatives—styrene-butadiene emulsions, styrene-polyester resins elastomers, styrene modified alkyd

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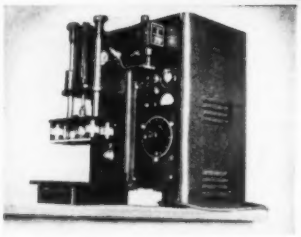

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resins, and styrenated oils—the booklet contains a comprehensive list of patent and literature references to styrene copolymers and reaction products. *Monsanto Chemical Co., 445 Park Ave., New York 22, N.Y.*

Phenolic foamable resin—Advantages and methods of packing objects in foamed Bakelite phenolic plastic are detailed in this 8-page booklet, "Bakelite Phenolic Foamable Resin—Packing Grade." Also described is the process of producing, or foaming, the resin for packaging purposes. Some of the foam's properties which are discussed include load-bearing capacity and resilience; thermal-insulating properties; and flame resistance. Special emphasis is placed on the economic benefits of the packing material in savings on postage, breakage, and time. *Bakelite Co., Div. Union Carbide and Carbon Corp., 300 Madison Ave., New York 17, N.Y.*

"Reinflastics"—A new low pressure laminate, called "Reinflastics," is described in this 16-page brochure. Properties—physical, electrical, thermal, chemical, and decorative—are covered. Also included is information on the production of flat panels, matched die and vacuum bag molded parts, expanded plastics, sandwich construction, and laminated phenolics. *Russell Reinforced Plastics Corp., 45 W. John St., Hicksville, N.Y.*

Laboratory equipment—Four new bulletins offer information on an assortment of laboratory equipment. Bulletin 570 describes a variety of instruments, including evaporators, McLeod gages, electric and air-power stirrers, proportioning pumps, etc. Bulletin 572 covers a new principle of air weight control, as applied in Con-Wate mechanical convection temperature control cabinets. Bulletin 574 gives specifications and performance data on two models of vacuum pumps. Bulletin 576 describes corrosion-resistant circulating pumps. *Andrew Technical Service, 3805 N. Clark St., Chicago, Ill.*

Optical comparator inspection—The full optical comparator inspection story—from "comparison" to "precision measurement"—is shown in this full-color sound 16 mm. motion picture, "What's the Difference?" Production line scenes were taken in various plants under actual working

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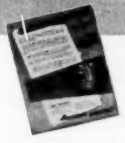
We believe the Liquamatte is the greatest advancement in close tolerance finishing in many years. We'd like the opportunity to prove it to you.



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conditions. *Jones & Lamson Machine Co., Dept. 710M, Springfield, Vt.*

Specification lacquers—A guide to specification lacquers for finishing military items is provided in this leaflet. The first section of the leaflet enables suppliers of finishes to find out what kind of lacquer finishing material is being called for when all they have is a specification number. In the second section, the permissible or appropriate specification numbers are grouped according to use. *Hercules Powder Co., Cellulose Products Dept., Wilmington 99, Del.*

Sylvania parts division—Facilities, operation, and products of the various sections in this division are explained and illustrated in this 20-page brochure. Operation of the plastics division is illustrated with photographs of facilities, presses, laboratories, and several of the plastics parts produced. *Sylvania Electric Products, Inc., Att: Mr. Penfield, 1740 Broadway, New York 19, N.Y.*

Drill press feed—Illustrations, dimensional drawings, and specification data are used in this 16-page bulletin to describe the company's drill press feed and the wide range of types and sizes in which it is available. A special section breaks the machine down into its basic controls and explains the functions and advantages of each. *The Bellows Co., Att: Mr. W. C. Richards, 222 West Market St., Arkon, Ohio.*

Styrofoam—General properties of this expanded polystyrene and its current applications, including low temperature insulation, buoyancy, and floral and decorative items, are given in an illustrated, 20-page technical data bulletin. *The Dow Chemical Co., Midland, Mich.*

Synco 128-CLW resin adhesive—Instructions for intermediate temperature marine laminating of white oak with Synco 128-CLW resin adhesive are contained in this leaflet. Also included is an outline of the adhesive's advantages as to longer permissible open and closed assembly time, long working life, and ease of handling. The method, as recommended in this particular leaflet, is concerned with treating the oak to meet the requirements of Specification MIL-A-397A; other leaflets are available on the applying of Synco 128-CLW to conform with 36 other government specifications. *Snyder Chemical Corp., Henry St., Bethel, Conn.*

Pre-plasticizing—This comprehensive report on pre-plasticizing is a 16-page bulletin (No. 5206) which contains illustrations of the company's pre-plasticizing injection molding machines in action and schematic drawings diagramming the function of the pre-plasticizing chamber. Some of the advantages of this process as pointed out in the booklet are increased plasticizing capacity, increased shot capacity, savings in weight and material costs, lower molding temperatures, less distortion, better color dispersion, and faster cycle time. *The Hydraulic Press Mfg. Co., Mount Gilead, Ohio.*

Organic chlorine compounds—The eleven organic chlorine compounds sold in commercial quantities by the company are described in this 28-page booklet (F-4769A), as to their uses, physical properties, specifications, and shipping data. Also in-

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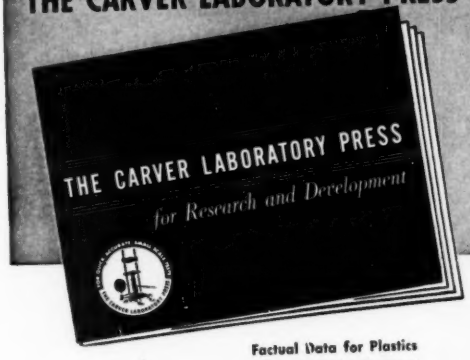

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cluded is a bibliography listing important references to the eleven compounds in chemical literature. *Carbide and Carbon Chemicals Co., Div. Union Carbide and Carbon Corp., 30 E. 42 St., New York 17, N.Y.*

Controllers—Eight types of the company's Model 40 Controller are described in this 32-page bulletin (No. 461) which contains 114 illustrations and diagrams. Each of the eight instruments—single action, dual, duplex, auto-selector, ratio, relation, pneumaticset, and time schedule—is pictured with a typical process diagram and a characteristic chart record. *The Foxboro Co., 26 Neponset Ave., Foxboro, Mass.*

Dry polyester resins—Three basic resins, marketed to the reinforced plastics industry under the trade name of Atlac and used in industrial laminates, are described in this 10-page booklet. Covered are the uses, physical properties, and general characteristics of the powdered, unsaturated 100% alkyd-type resins. Atlac 382 is used as an alkyd component, when dissolved in copolymerizing agents, for low pressure lamination or coating of Fiberglas, paper, plywood, nylon, asbestos, and other materials. An accompanying table shows wet strength retention, electrical characteristics, resistance to alkali, dimensional stability, and heat distortion points. Atlac 370 and 363 are designed for prebonding and preforming glass fiber mat where random fiber distribution prevails. Both are pre-catalyzed with benzoyl peroxide and are suitable for pastel or water white laminates. *Atlas Powder Co., Wilmington 99, Del.*

Fatty acids chart—The composition and important physical properties of the 46 most widely used processing oils and fats are tabulated on this reference chart that measures 17 in. by 11 inches. Data include empirical formulas, molecular weights, boiling and melting points, iodine number, and saponification value. *Technical Products Div., E. F. Drew & Co., Inc., 15 E. 26 St., New York 10, N.Y.*

Multi-screw extruders—Two 4-page bulletins, each containing diagrams, specifications, and photographs, are available on the company's multi-screw extruders. Model R.C. 100 Twin Screw Extruder has a nominal output of 100 lb. per hr.; Model R.C. 200, a triple screw extruder, is a heavy duty machine with a nominal output of 200 lb. per hour. These machines are used for compounding, coloring, and pelletizing as well as extruding. *F. J. Stokes Machine Co., 5500 Tabor Rd., Philadelphia 20, Pa.*

Vegetable oleic acid—Specifications, composition, and applications of the new vegetable oleic acid, Emersol 240 Vegetable Elaine, are discussed in this 5-page technical bulletin. The booklet outlines the main features of this new product—its origin, oxidation stability, and bland odor—and contains charts illustrating oxidation stability. *Emery Industries, Inc., Dept. 5, Carew Tower, Cincinnati 2, Ohio.*

Photoelectric equipment for industry—Amplifier relays and light source and phototube units standardized to eliminate the high cost of specially engineered apparatus are cataloged in this 4-page bulletin. Each of the instruments are illustrated and described as to operation, specifications, and their application

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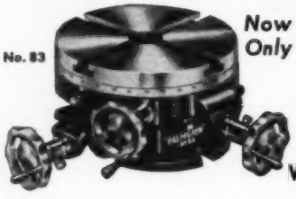

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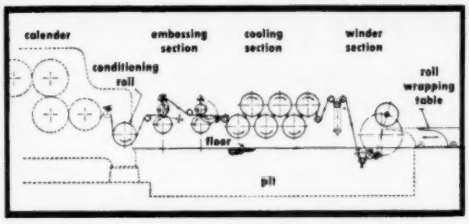
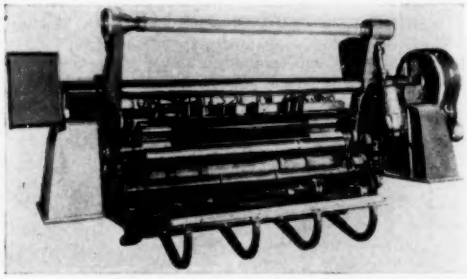


Complete Plastic Take-offs



Kohler Model 40-S Continuous Winder

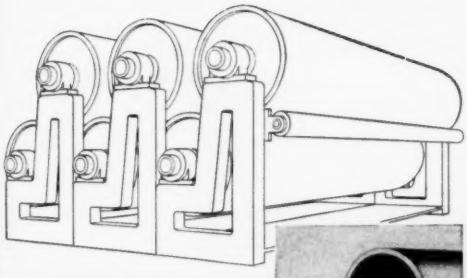
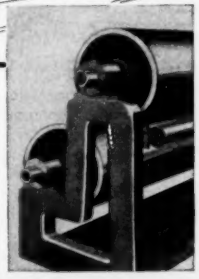


Photo drawing of Cooling Train



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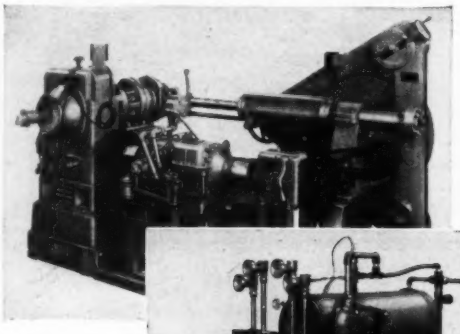
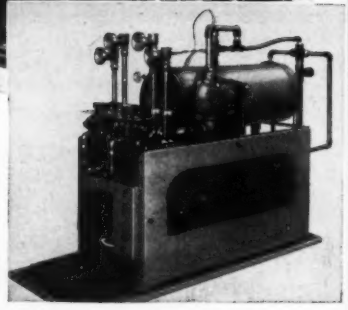


↑ Royle #2 (3¼") Continuous Vulcanizing Extruder for room temperature compound process.



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in solving production control problems. *De-Tec-Tronic Laboratories, Inc., 1711 Terra Cotta Place, Chicago 14, Ill.*

Dyeing synthetic fibers—Current solutions to the complex problems of dyeing the new synthetic fibers and blends are offered in this 28-page revised booklet. The methods described are not final in nature, but they are believed to be the most current ones since they include new data and approaches. Synthetics covered are Dacron, Dynel, Acrilan, Orlon, Vicara, nylon, acetate, Celcos, saran, and Fortisan. *General Dyestuff Corp., 435 Hudson St., New York 14, N. Y.*

Santicizer 3—Information on Santicizer 3, a sulfonamide type plasticizer particularly useful in formulating heat-sealing or heat sensitive adhesives and lacquer coatings, is offered in this technical bulletin. Included are chemical properties, physical properties, and typical formulations for nitro-cellulose heat-sealing coatings and paper coating lacquers, polyvinyl acetate adhesives; zein metallic decorative paper coatings; back coatings for pressure sensitive tapes; and hot melts for paper adhesives. *Monsanto Chemical Co., St. Louis 4, Mo.*

Floor drill—Technical information on the company's sliding head floor drill with tilting motor bracket for easy speed changes is available in this 4-page catalog. *Cincinnati Lathe and Tool Co., Cincinnati 9, Ohio.*

Carbo-Kote 6020—Technical information on Carbo-Kote 6020, an improved thermosetting furan coating, is available in a bulletin and a data sheet (No. C-46). The bulletin presents data on corrosion resistance and a new heat resisting primer for steel and concrete. The data sheet covers the properties and advantages of the coating. *Carboline Co., 7603 Forsyth Blvd., St. Louis 5, Mo.*

Hose assemblies—Industrial rubber hose assemblies for all types of plastics processing equipment and machinery are illustrated and described in this 8-page catalog. Included is information as to prices, sizes available in each of the categories, specifications, and characteristics. *Carlyle Rubber Co., Inc., Dept. U-4, 62-66 Park Place, New York 7, N.Y.*

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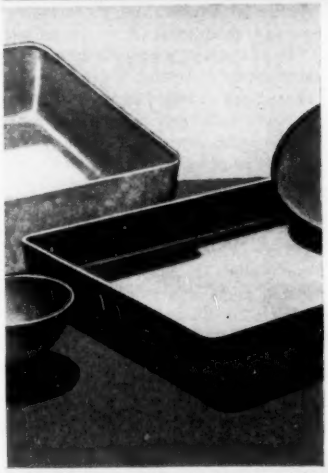

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INTERNATIONAL PLASTICS NEWS*

Activities Around the World of Interest and Importance to the Plastics Industry in the United States

Saran in Japan—Facilities for the production of saran will be built at Nobeoka, Kyushu, by Asahi-Dow Ltd., recently formed associate of Dow Chemical International Ltd. and The Asahi Chemical Industry Co., a large Japanese chemical and textile manufacturer.

President of the new company is Tadayoshi Kitamura, former managing director of Asahi Chemical. Max Key, assistant production manager of Dow Chemical's saran department, has been named vice-president.

Each of the participating companies has named six members to the board of directors of the jointly-owned corporations. Dow's interests are represented by Clayton S. Shoemaker, president of Dow International; Donald Williams, Dow Chemical's director of sales; William A. Groening, Jr., Dow's assistant general counsel; Fred H. Brown, assistant treasurer of Dow; Leonard C. Chamberlain, Jr., director of plastics research of Dow; and Mr. Key.

Asahi representatives, in addition to Mr. Kitamura, are: Takenobu Kataoka, president of Asahi; Kagayaki Miyazaki, managing director; Manabu Enseki, chief of the foreign department; Yoshio Tsunoda, research chief; and Zenzaburo Ueki, manager of Asahi's Nobeoka plant.

Plastics congress in Turin—The Fourth International Congress on plastics will be held in Turin, Italy, September 29 to October 1, 1952. Following the congress, the technical committee on plastics of the International Standards Organization will meet October 2 through October 5. The ISO Plastics Committee is anxious to have a strong American delegation at the Standards Committee meetings. Those interested in attending should contact the S.P.I.

Fifteen of the committees and subcommittees of the International Organization for Standardization met at Columbia University, New York, for two weeks beginning June 9. At those meetings they discussed standardization of screw threads, ball and roller bearings, iron and steel, petroleum products, cinematography, textiles, machine tools, limits and fits, preferred numbers, lac, mica, and standards marks.

Australian butyrate pipe—Some 5 million feet of extruded cellulose acetate butyrate Tenite II pipe, 1 in. in diameter, are now in use in Australia for the purpose of piping water in irrigation systems. This amount of pipe has been installed during the past five years, and the manufacturer reports that the only troubles encountered have been as a result of improper installation.

All of the pipe in use in Australia has been produced by Parfrey Plastics Pty., Ltd., East Melbourne, using Tennessee Eastman material. Parfrey offers a five-year guarantee on all of its pipe when properly laid and estimates that at least 10 years is the probable life expectancy. This contrasts with a maximum 12-month life of metal pipe in many sections of Australia where highly corrosive ground conditions are encountered.

In addition to the plastic pipes' resistance to corrosion, it can be purchased and installed in many cases at a lower total cost than metal pipe of the same capacity. Factors which enter this phase of the economics include the light weight of the plastic pipe, the long distances between "stations," and the necessity for skilled labor in the installation of metal pipe. The plastic pipe is being installed on long runs by unskilled labor who can put the pipe in place and make perfectly satisfactory joints and connections with a minimum of time and trouble.

In many sections of Australia the ground conditions are such that the pipe can be laid without trenching. One end of the pipe is simply attached to a mole plow which pulls it through the ground at a depth of approximately 2 ft., the ground in turn closing over the pipe as the plow progresses. As much as 600 ft. of 1-in. pipe have thus been installed in one run, and one station irrigation project alone has used 250,000 feet.

A high safety factor is set by placing the working pressure of the butyrate pipe at 100 p.s.i.; working pressures of 200 p.s.i. are reported to be practical if the pipe is buried at least 15 inches.

Fully automatic—At the British Industries Fair in Birmingham in May, 1952, R. H. Windsor Ltd. demonstrated the fully automatic operation of its 4-oz. injection machine. The controls for this operation include an electrical limit switch which will bring the machine to an automatic standstill if there is any obstruction greater than 0.0005 in. between the mold platens. With this equipment, the Windsor 4-oz. machine can be safely operated up to 180 shots per hr. on a fully automatic cycle.

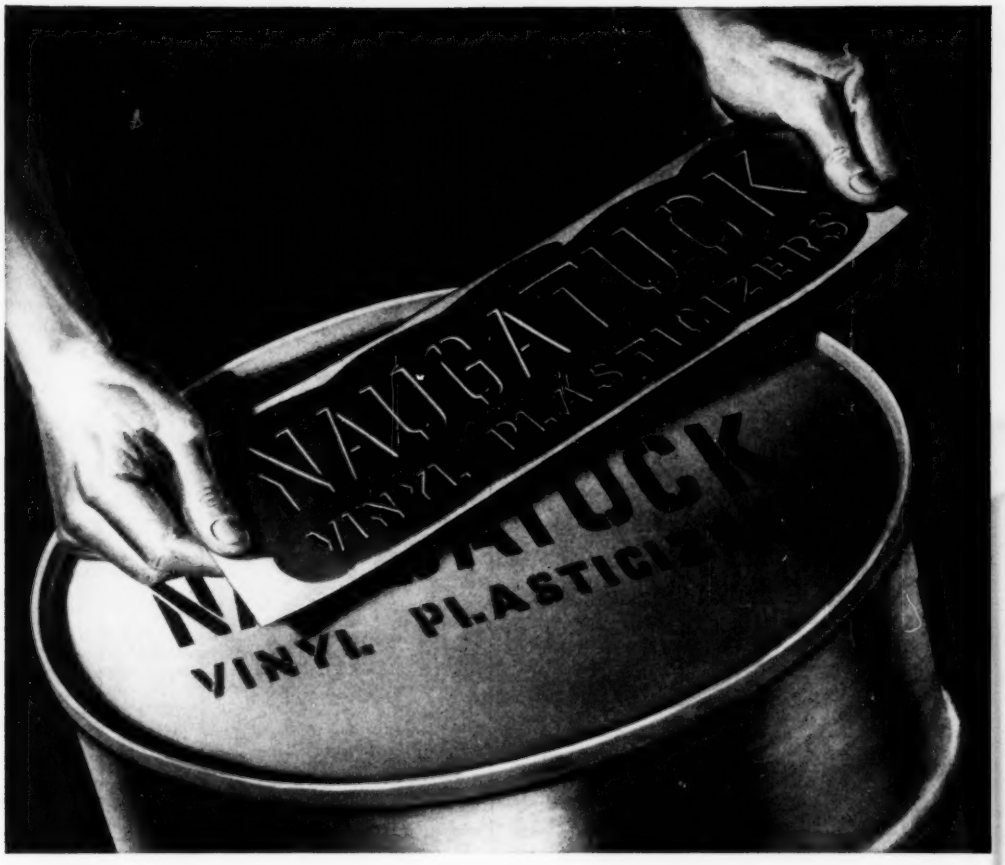
German plastics exhibition—The first postwar exhibition of the German plastic industry will be held in Duesseldorf October 11 through 19, 1952. About 31,100 sq. yd. of space in the Duesseldorf Exhibition Grounds will be used to show the products of the plastics industry, including synthetic fibers. Machinery, testing instruments, molds, mixers, and other equipment will also be displayed.

Among the applications in the exhibit will be electrical insulation, such as a wide-band cable for television transmission; corrosion-proof plastic piping; packaging applications such as foils, adhesive strips, tubes, and molded containers; upholstery materials; paints and coatings.

Further information regarding the exhibition can be had from the German-American Trade Promotion Office, 350 5th Ave., New York, N. Y.

Extruder representative—Barzantni International, 185 N. Wabash Ave., Chicago, Ill., has been appointed sole representative for the United States, Canada, and Mexico for the Luigi Bandera Co., Milan, Italy. Barzantni will handle the Bandera line of plastic and rubber extrusion machines as well as hydraulic presses and machine tools. Barzantni also represents Italian manufacturers of compression presses and injection presses ranging from ¾- to 42-oz. capacity.

* Reg. U. S. Pat. Office.



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- **DiCapryl Phthalate**
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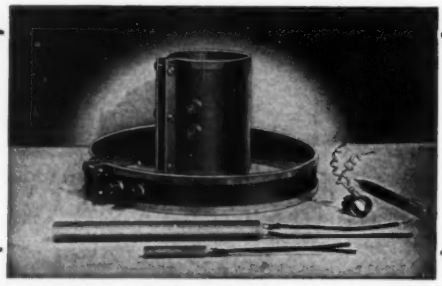

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Production of

FOR the purpose of this report, production is the sum of the quantities of materials produced for consumption in the producing plant for transfer to other plants

PLASTICS AND SYNTHETIC RESIN PRODUCTION
From Statistics Compiled

Materials	*Total p'd'n. first 3 mos. 1952*	*Total sales first 3 mos. 1952*
CELLULOSE PLASTICS:[a]		
Cellulose acetate and mixed ester plastics:		
Sheets, under 0.003 gage	3,215,240	2,744,865
0.003 gage and over	2,067,442	1,978,670
All other sheets, rods and tubes	1,457,072	1,211,767
Molding, extrusion materials	12,801,041	12,294,840
Nitrocellulose:		
Sheets	1,328,516	1,195,749
Rods and tubes	179,768	244,965
Other cellulose plastics[b]	2,309,740	1,869,959
PHENOLIC AND OTHER TAR ACID RESINS:		
Laminating	16,401,594	9,944,440
Adhesive	9,402,538	8,602,101
Molding and casting materials[a]	47,343,292	36,318,769
Protective coatings (unmodified and modified except by rosin)	7,564,091	5,993,318
Miscellaneous uses	15,497,173	13,478,208
UREA AND MELAMINE RESINS:		
Adhesives	18,524,213	17,781,785
Textile-treating resins	8,697,216	8,243,129
Paper-treating resins	5,635,609	4,936,407
Protective coatings, modified and unmodified	5,168,529	4,428,541
Miscellaneous uses, including laminating and molding[c]	13,529,093	13,868,314
STYRENE RESINS:		
Molding materials[a]	63,348,523	48,686,767
Protective coatings, modified and unmodified	13,916,540	14,621,071
Miscellaneous uses	16,515,721	12,240,215
VINYL RESINS:[d] Total	121,899,434	99,743,161
Sheeting and film (resin content)[e]		39,874,231
Adhesives (resin content)		3,408,673
Textile and paper-treating resins (resin content)[f]		9,725,536
Molding and extrusion materials (resin content)		35,732,567
Protective coatings (resin content)		4,064,549
Miscellaneous uses (resin content)		6,937,605
COUMARONE-INDENE AND PETROLEUM POLYMER RESINS:	42,170,576	41,792,638
MISCELLANEOUS SYNTHETIC PLASTICS AND RESIN MATERIALS:		
Molding materials[a, g]	24,031,954	23,653,020
Protective coatings[h]	5,030,248	5,991,010
All other uses[i]	21,577,333	22,026,270

* Dry basis is designated unless otherwise specified. [a] Includes fillers, plasticizers, and extenders. [b] Includes sheets, rods, and tubes, and molding and extrusion materials. [c] Data on resins for laminating and miscellaneous uses are on a dry basis; data on molding materials are on the basis of total weight. [d] Production statistics by uses are not representative, as end-use may not be known at the time of manufacture. Therefore, only statistics on total produc-

Plastics Materials

of the same company, and for sale. Sales include only the quantities involved in bona fide sales in which title passes to the purchaser.

POUNDS[a] FOR FEBRUARY, 1952, AND MARCH, 1952 by U. S. Tariff Commission

February 1952		*March 1952*	
Production	*Sales*	*Production*	*Sales*
784,778	836,733	696,950	737,358
699,928	636,022	699,214	701,057
456,812	356,733	445,011	409,492
4,178,472	4,053,078	4,379,876	4,300,800
439,264	391,033	429,943	394,017
68,379	89,025	49,403	68,063
791,592	729,808	783,993	518,468
5,148,287	2,981,405	6,017,084	3,589,169
3,136,124	2,999,604	3,080,536	2,857,524
15,359,574	11,323,741	14,318,217	11,205,461
2,323,681	2,099,304	2,498,007	1,777,184
5,087,202	4,230,542	4,845,769	4,342,639
6,085,931	6,163,385	6,587,661	5,821,007
2,794,897	2,903,364	2,664,983	2,296,202
1,794,546	1,606,059	2,026,269	1,647,727
1,667,201	1,438,865	1,847,045	1,627,022
4,257,291	4,213,142	4,169,526	4,915,508
20,517,096	15,863,991	21,078,070	17,701,462
4,685,499	4,683,614	4,953,417	5,202,697
6,000,844	3,634,623	4,873,115	4,151,453
39,245,388	31,236,256	39,208,362	35,160,275
	12,733,750		14,015,737
	1,072,902		1,213,901
	3,326,707		3,368,306
	11,190,429		12,770,274
	1,140,672		1,401,943
	1,771,796		2,390,114
14,370,396	14,305,711	13,870,609	13,768,940
7,314,332	8,235,244	8,284,717	7,614,083
1,430,815	2,025,479	2,026,230	2,268,615
5,848,353	6,703,374	8,301,736	7,921,247

tion are given. [a] Prior to January 1951, statistics were given on the basis of total weight. [f] Includes data for spreader and calendering-type resins. [g] Includes data for acrylic, polyethylene, nylon, and others. [h] Includes data for epichlorohydrin, acrylic, polyester, silicone, and other protective coating resins. [i] Includes data for acrylic, rosin modifications, nylon, silicone, and other plastics and resins for miscellaneous uses.

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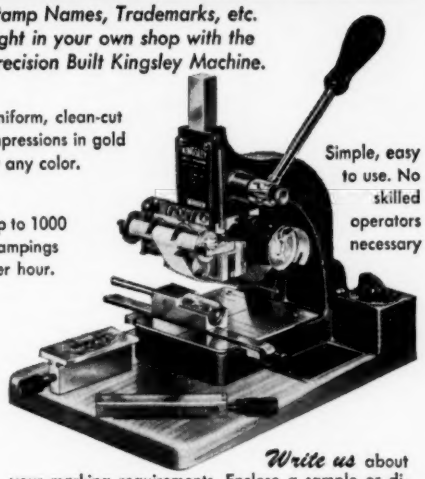

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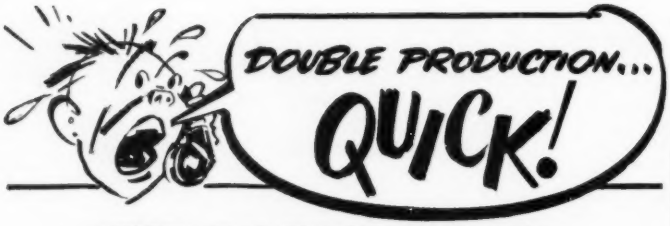

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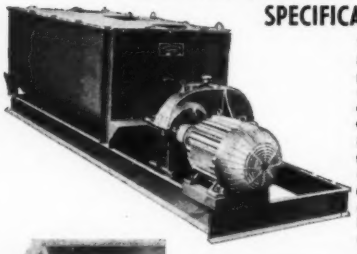

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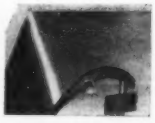

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New Source for

IN many respects the recent announcement by Union Carbide and Carbon Corp. that their plant for coal hydrogenation is ready for production is the most important story that has come from the chemical industry in years. Essentially it means that the aromatics branch of the chemical, industry and particularly plastics, will no longer be solely dependent upon the steel, natural gas, or petroleum industry for such products as benzol, phenol, naphthalene, and other raw materials when coal hydrogenation becomes a large scale operation. Union Carbide has proved it is possible to produce coal chemicals profitably by this process in an $11 million semi-works plant that can now process from 300 to 500 tons of coal a day. This plant is probably the forerunner of an establishment that will process as much as 3000 tons of coal a day and may cost anywhere from $100 million up.

The new Carbide hydrogenation plant is said to require a smaller investment than the experimental government plants which are primarily designed to obtain liquid fuel from coal and which bring in aromatic chemicals as a by-product. The new Carbide plant, designed to produce chemicals only, eliminates one complete step in the coal-hydrogenation-for-fuel process.

Over 100 chemicals have been identified in the primary product of this plant. Many of them are new and open new fields for development. Of particular interest to plastics will be naphthalene, toluene, phenol, cresols, and benzene.

Despite the scope of this operation, the reader should be warned that it does not mean that there will suddenly be a great gushing fountain of coal chemicals. In this country about 100 million tons of coal are coked annually from which 800 million gal. of tar are obtained, but only 650 or 700 million are distilled for chemicals—the rest is burned. A little over 20 million lb. of natural phenol, or about one-third of a lb. per ton of coal, comes direct from this coking process—the balance of last year's 480 million lb. of phenol was from benzol.

The Union Carbide coal hydrogenation process, which it is claimed

Coal Chemicals

will produce 60 to 80 times as much natural phenol per ton of coal, might thus produce from 2 to 4 million lb. per year if the plant is operated at from 300 to 500 tons of coal per day. Currently that isn't a very big dent in today's phenol production figure. The naphthalene situation is similar. Normal production from coking operations is 7 or 8 lb. per ton of coal—the Carbide Corp. process will produce 5 to 8 times more per ton. Total production of naphthalene is running close to 400 million lb. a year now, so the 6 or 7 million lb. that might be produced from the coal-hydrogenation plant is not particularly significant in total production at the moment. No comparative figures have been given for such things as benzene, cresol, and cresylic acid, but it is known that the yield of cresol and cresylic acid at least will be high.

Many other chemicals not particularly important to plastics will be produced. Aniline, for example, is one which is now unavailable from coke-oven operations, but requires some 12 to 15 million gal. of benzol to satisfy present day needs. Thus, part of the coal-tar benzol normally used for aniline would be available for other purposes.

Union Carbide says chemical users should not expect commercial quantities of products from the new plant immediately. First they must determine which products can be economically separated from the stream and then install complete separation and refining facilities. The quantities of aromatics like benzol and phenol to be produced would supply only a very small portion of Carbide's needs and therefore will not be for sale. But other products and completely new molecules will no doubt soon be available from the company.

It is easy to understand that it will be many years before the full impact of this development is fully realized in the coal chemical supply line, but continued operation will provide many improvements to be incorporated in larger, more economical plants. In the meantime, the present plant will provide coal chemicals for sales development work as well as valuable operating experience.

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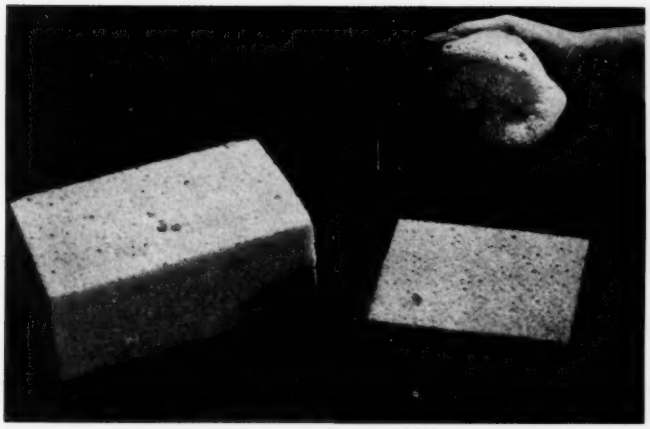

Sponge, formed by reacting polyvinyl alcohol with formaldehyde and acid in a mold, is more pliable and has better abrasion resistance than other synthetic or natural sponges

Better Plastic Sponges

JOINING the large family of natural and synthetic sponges is a polyvinyl formal sponge produced primarily for household use by Ivano, Inc., at its Benton Harbor, Mich., plant.

The process for production of the sponge, called Ivalon, is credited to Dr. Christopher Wilson, Ohio State University. It involves beating air into a solution of polyvinyl alcohol containing formaldehyde and sulfuric acid to produce a frothy mass which is poured into forms. The concentrations are formulated so that reaction occurs slowly and the froth sets up after pouring.

After the formal resin has set, the solvent is washed out, leaving a porous, white solid that resembles bread. This polyvinyl formal product is then washed and cut up in the same manner as other synthetic sponges. Production by this "wet" process takes about two days for completion, as opposed to ten days for making cellulose sponge.

The sponge is firm when dry, but when wetted, it becomes very soft, a property imparted by the presence of hydrophilic free hydroxyl groups in the resin. Its liquid capacity is comparable to other sponges. It can be sterilized, and withstands boiling water, boiling caustic soda solution, cold 30% sulfuric acid, soaps, and most detergents.

Properties of the vinyl sponge compare favorably with those of other conventional sponges. It resists mold growth which often attacks natural sponge. It withstands aging better than does rubber and, in addition, is superior to rubber sponges in that it is not harmed by ordinary dry-cleaning solvents.

In comparison to cellulose sponges, vinyl sponges are softer, last longer, have superior resistance to acids and alkalies, and are twice as resistant to abrasion. According to recent tests, the vinyl sponges are 17 times as resistant to twisting as the cellulose sponges; damp test samples of Ivalon measuring 1 in. by 1 in. by 4 in. averaged 324,000 twist cycles before tearing half way through, while similarly cut cellulose sponges failed after 19,000 twist cycles.

An interesting application of this polyvinyl formal sponge is its use as a lung prosthesis (see "Why Doctors Are Using More Plastics," MODERN PLASTICS, Oct. 1951, p. 88). Because the sponge has the same density and consistency as lung tissue, it can be used to fill the chest cavity in cases where the lung has been removed; the hole must be filled to prevent surrounding tissue from growing abnormally. The sponge is simply trimmed to shape, sterilized by soaking in saline solution and penicillin, and sewn in place.

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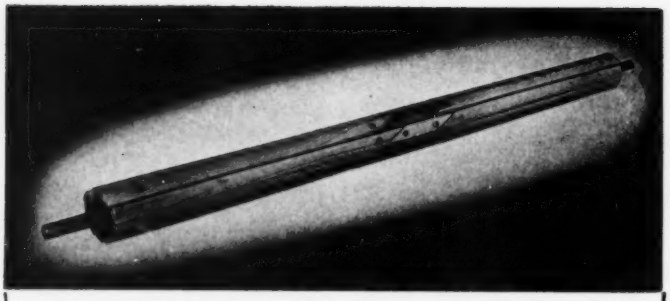

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Vinyl Wheels

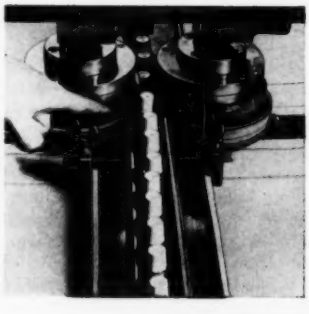
ABRASION resistance of vinyl plastisol, utilized in rotating disks of a closure-tightening machine, solved a production problem at Revlon Products Co., New York, N.Y. In the production line set-up, glass bottles filled with nail enamel are capped with knurl-patterned urea closures. Each closure is screwed down to an exact degree of tightness which must be tested frequently; the bottles are placed on a moving belt which passes between two revolving disks of the tightening machine and these disks test and adjust the tightness of each closure.

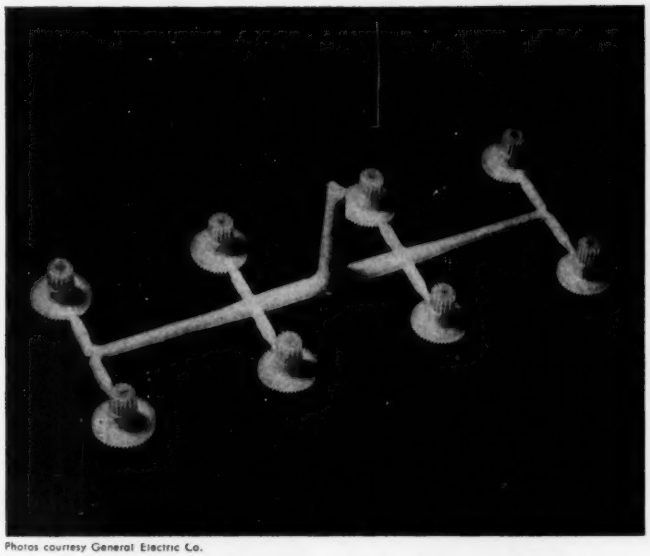
The problem troubling Revlon was that the knurled closure exerted a cutting action on the tightening wheels, which were made of rubber. As a result, the rubber wheels had to be replaced every eight hours. Furthermore, the wheels needed adjustment several times during their 8-hr. life as their surface wore away and their action on the urea closure relaxed.

Investigation of other elastometric materials with better abrasion resistance led to the choice of a plastisol compound made with Geon paste by Rubber Corp. of America, Brooklyn, N.Y. The compound is poured into a cylindrical mold and heated by placing the mold on a hot-plate. A sheet metal cover placed over the mold retains the heat. The paste fuses at 375° F.

The plastisol compound is formulated for maximum abrasion resistance, and the vinyl tightening wheels now last as long as 160 hr.—an increase of 2000% over the service life of rubber wheels.

Vinyl cap-tightening wheels resist abrasive action of knurled urea closures





Photos courtesy General Electric Co.

Nylon gear is molded in one piece in an eight-cavity mold and run on a modified Reed-Prentice machine. Gears are pictured above before removal of sprue and runners

Nylon Gears Lower Cost

COST savings for gears averaging 63% have resulted from replacing metal parts in a General Electric Co. oscillating fan with molded nylon gears. The saving is due to the elimination of finishing and assembly operations because the nylon gears are molded in one piece; the gears formerly used—a two-part unit consisting of a steel pinion and a separate laminated plastic part—required hobbing, cutting, and assembly operations. No machining is required on the nylon worm wheel and pinion unit.

The nylon piece is molded in an eight-cavity mold, and is run on a modified Reed-Prentice machine at the Taunton, Mass., molding plant of General Electric's Plastics Department. Cavities for the worm wheel were cut on a gear shaper, and the pinion cavities were hobbed. Cycle for the molding operation is in the neighborhood of 50 sec.; and temperature of the cylinder is 620° F. at the rear and 570° F. at the front. The nozzle has a heater which is operated at 500° F. Line pressure on the injection plunger is 1000 p.s.i.

The nylon gears, which are now in use in two models of the oscillating fan, rotate at a speed of 32 r.p.m. with a maximum torque of 6.75 oz.-inches. In testing the operating efficiency of the fans, it was found that the nylon gears have better wear characteristics than the previously used steel and laminated gears. Quieter operation, in addition to the substantial cost savings, has also been obtained by making use of the nylon gears.

Nylon gear being mounted in fan. It replaced costlier metal-laminate gear

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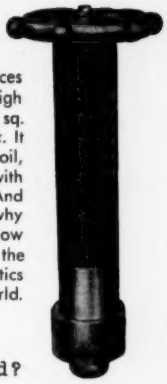

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Wine Pipe

AFTER eight years of continuous service, butyrate piping used to transport wine at the winery of G. F. Heublein & Bro., Inc., Hartford, Conn., is still in excellent working condition. A recent check on the 2-in. pipe installation revealed complete absence of corrosion from contact with wine; transparency of the pipe is still good, permitting a visual check of the flow at any point. Five separate pipelines, totaling about 2000 ft., are used at the winery to carry wine from the storage vats to the tax payment tanks, and then to the bottling room.

The butyrate pipes, produced by Extruded Plastics, Inc., Hartford, Conn., are subjected to a variety of operating conditions, including outdoor exposure. They successfully withstand wine temperatures ranging from 18 to 112° F.; alcoholic content as high as 24% by volume; pumping pressure up to 50 pounds.

Butyrate was originally selected because of its ability to withstand rough treatment from tools and equipment, and to be bent into curves for installation. Lengths of pipe were joined by butyrate couplings, and the pipelines were shaped, by heat and pressure, to run in various planes and angles. After each run of wine, the pipes are rinsed with an antiseptic solution.

Butyrate pipe retains its transparency (see worker's hand) after 8 years' use

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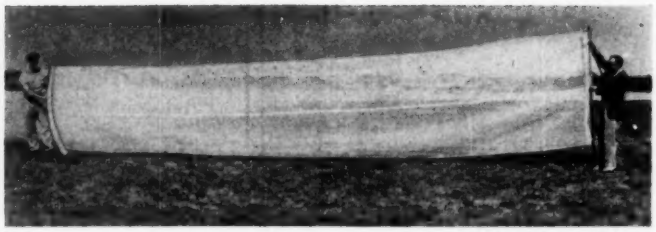


All photos courtesy Bakelite Co.

Two strips of loosely woven polyethylene fabric 36-in. wide are seamed together to form a banner-type aerial gunnery tow target measuring 30 ft. long and 6 ft. high

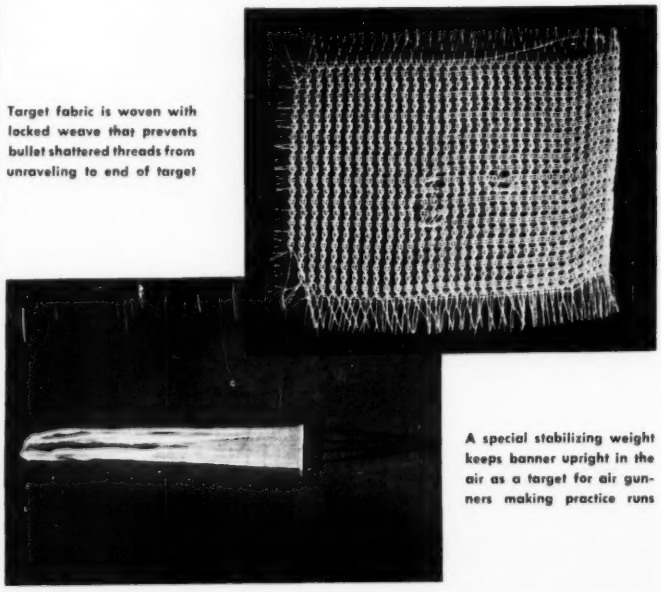
Polyethylene Tow Target

AERIAL tow targets, loosely woven of polyethylene filament, have been adopted for use by the U.S. Navy and Air Force because of the material's ability to retain its flexibility when flown at high speeds and high altitudes. At levels of 20 to 30 thousand ft., temperatures are very low, and while most other materials become brittle and break at these low temperatures, polyethylene remains flexible at 60° below zero; in addition, the minor degree of stiffening at extremely low temperatures tends to give it greater tensile strength under stress. The flat, banner-type targets also undergo high stress from flutter produced by speeds of over 300 miles per hour.

Polyethylene for tow targets is extruded as monofilaments 0.019 to 0.023 in. in diameter by Reeves Brothers, Inc., New York, N.Y., using Bakelite material. The woven fabric is made with a locked leno weave which holds the bullet-shattered threads in place and prevents them from unraveling to the end of the target to destroy evidence of successful hits.

Two 36-in. widths of the woven polyethylene fabric are seamed together to form a banner about 30 ft. long and 6 ft. high. A special stabilizing weight keeps the banner upright in the air. Targets are manufactured by F. L. & J. C. Codman Co., Rockland, Mass.

Target fabric is woven with locked weave that prevents bullet shattered threads from unraveling to end of target



A special stabilizing weight keeps banner upright in the air as a target for air gunners making practice runs

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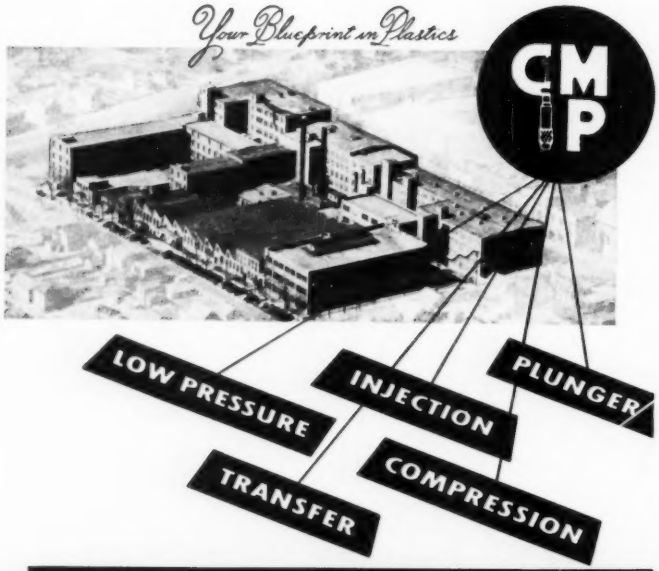

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FABRICON

Mortar Pans

MORTAR pans molded of reinforced plastic material have won the enthusiastic endorsement of masons because of their light weight. By producing the pans of American Cyanamid Co.'s polyester resin reinforced with fibrous glass, the manufacturer, Joseph W. Taylor Corp., is able to offer pans weighing less than one-fourth as much as conventional steel pans of equal capacity. The plastic pan tips the scale at 4 lb., the steel pan at 18 pounds.

Called "Even-Keel," the new pan is produced from a plastic material which is stronger, weight for weight, than steel. It has a capacity of 2.4 cu. ft., measures 29 in. by 20 in., and has a depth of 7 inches.

In addition to their light weight, Even-Keel pans are easy to keep clean. Dried mortar will not stick as readily to the inside of the plastic pan as it will to a steel pan. And the residue that is left over can easily be removed by simply flexing the upturned tray; the dry mortar falls away immediately because the reinforced plastic has a high degree of resiliency. To remove mortar from steel pans, workmen have to hammer the outside of the tray, thus disfiguring it and shortening its life.

Even-Keel pans are one-piece, seamless moldings containing no rivets or folds around which mortar can become lodged. They retain their shape better than metal trays, have greater resistance to impact, and will not sag or dent.

The pans are molded in a narrow, streamlined shape which, together with their light weight, makes them easier to handle when used on precarious scaffolding.

Polyester-glass mortar pan is lighter, stronger than conventional steel pans

Weather Strip

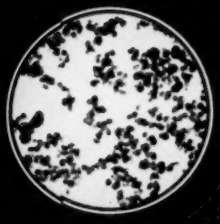
DEVELOPMENT of a butyrate-rubber weather strip for doors that eliminates drafts, dust, and noises caused by air passing through abutting glass doors has been announced by Abbott Glass Co., New York, N.Y. The weather-stripping, a patented product called Abco, was developed after a year's research.

Two component parts comprise the weatherstripping—a square butyrate column, extruded by Anchor Plastics Co., New York, N.Y., with one side of the column left open, and an extruded rubber strip. The device is assembled by sliding the rubber inset into a depression that runs the length of the column in one corner opposite the open side. To attach Abco to abutting doors, the open side of the butyrate column is simply slipped over the edge of one glass door; the butyrate grips the glass and the rubber strip rests on the edge of the facing door.

Designed exclusively to fit tempered Herculite glass doors, Abco can be used on single- as well as double-action doors.

Extruded butyrate strip (right) is attached to door by slipping open side of column over the door panel (below)

How well do you see?



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PREIMPREGNATED LAMINATING STOCK. General descriptions of the characteristics of glass cloth, glass mat, paper, and synthetic fibers which have been impregnated with melamine, silicone, diallyl phthalate, and other resins for high and low pressure laminating. U. S. Polymeric Chemicals. **(G-201)**

METALLIC STEARATES. Bulletin on Cyanamid metallic stearates which are used as internal lubricants in molding powders, as mold dusting agents for hard-to-mold shapes and for breaking in new dies. American Cyanamid Co. **(G-202)**

INSTALLING "MONOTOP" PLASTIC SURFACING. Booklet gives instructions on installation procedure for G-E Textolite "Monotop" one piece plastic work surfaces. Includes tools needed, mitered corners, and other fabricating data. General Electric Co. **(G-203)**

PLASTIC FACILITIES. Bulletin illustrates the facilities for injection, compression, extrusion, and reinforced plastics molding available at American Plastics Corp. **(G-204)**

VINYL ACETATE RESINS. Description of the advantages and limitations of the many types of "Vinylite" vinyl acetate resins. Essential data on solution, viscosity, film strength, compatibility, and softening temperature. Also information required to formulate these materials. Bakelite Co., Div. of Union Carbide and Carbon Corp. **(G-205)**

SURFACE PYROMETERS. Described are various standard, combination, and special models of Cambridge pyrometers. Price list included. Cambridge Instrument Co., Inc. **(G-206)**

PLASTICIZERS FOR VINYLS. Brochure gives comparison of physical and chemical properties achieved with eighteen different plasticizers, compounding information, and typical formulations for various applications of vinyl plastics. Hardesty Chemical Co. **(G-207)**

"DUREZ PLASTICS NEWS." Latest issue of this house organ contains data on Durez applications including a television escutcheon, timer housing, and several small electrical parts. Durez Plastics & Chemicals, Inc. **(G-208)**

INJECTION MOLDING MACHINE. Bulletin gives specifications and complete dimensions of the "IMPCO" four- to six-oz. injection molding machine. Improved Paper Machinery Corp. **(G-209)**

INDICATING PYROMETRIC PROPORTIONING CONTROLLERS. Details on the Model JP "Gardsman" proportioning controller for automatically maintaining precise temperature levels in injection molding machines, extruders, furnaces, ovens, and other units where such control is desirable. Taco West Corp. **(G-210)**

HANDLING WEBS AND MONOFILAMENTS. Some primary considerations with respect to handling of continuous strand or web materials. Data on extrusion take-up, plastic tubing, and textiles coated with plastic. Industrial Ovens, Inc. **(G-211)**

WET BLASTING MACHINE. Bulletin describes a new machine for wet abrasive blasting for all cleaning application in chemical and metal working industries where close tolerances must be maintained. American Wheelabrator and Equipment Corp **(G-212)**

LAMINATED RODS AND TUBES. Booklet explains the various methods of manufacture of Synthane laminated thermosetting tubes and rods. Lists various grades corresponding to government specifications and describes their characteristics and applications. Synthane Corp. **(G-213)**

STABILIZER FOR VINYL. Bulletin on "BARCA 10," a new liquid stabilizer for vinyl resins which combines barium and cadmium and is characterized by excellent heat and light resistance and outstanding performance in plastisols. Deecy Products Co. **(G-214)**

VACUUM COATING UNITS. Bulletin compares the features of eight different units for vacuum deposition of thin films of metals or other solids on molded plastic items and explains their method of operation. Distillation Products Industries, Div. of Eastman Kodak Co. **(G-215)**

HOW TO PREPACK IN CORRUGATED BOXES. Booklet explains the advantages of having the manufacturer packing merchandise in printed corrugated selling units so that it can be delivered to the dealer and the customer without repackaging. The Hinde & Dauch Paper Co. **(G-216)**

TESTING MACHINES. House organ discusses two testing machines of interest to plastics manufacturers—a high capacity machine for testing large specimens and a low magnification stress-strain recorder. Tinius Olsen Testing Machine Co. **(G-217)**

INJECTION MOLDING MACHINE. Bulletin lists features and specifications of the Windsor 20- and 32-oz. injection molding machines. R. H. Windsor Ltd. **(G-218)**

"KEL-F" OILS, GREASES, AND WAXES. Technical bulletin discusses "Kel-F" oils, greases, and waxes as lubricating agents, sealing mediums, and for applications where inertness is a basic requirement. The M. W. Kellogg Co. **(G-219)**

CELANESE ACETATE SHEETING AND FILM. Brochure gives sizes, colors, physical and thermal properties, formulations, applications, and forms available for Celanese acetate sheeting and film. Celanese Corporation of America. **(G-220)**

RAZOR BLADE SLITTER AND REWINDER. Booklet enumerates general features of Beck razor blade slitters and rewinders which guarantee accurate economical performance on cellophane, acetate, plastics, foil laminates, and other materials. Lists attachments which increase the machines' productive range. Charles Beck Machine Corp. **(G-221)**

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MOLDING FACILITIES. Folder covers the engineering, tool and die, fabricating, and thermoplastic and thermosetting molding facilities available at Shaw Insulator Co. **(G-222)**

MOLDS AND DIES. The services offered by The Parker Stamp Works in the manufacture of all types of plastic molds and die casting dies are covered in this folder. The Parker Stamp Works, Inc. **(G-223)**

DRYING SAND CORES. Bulletin tells about use of "Chromalox" electric radiant heaters in the drying of wash-dipped sand cores. Edwin L. Wiegand Co. **(G-224)**

REINFORCED PLASTICS. Booklet describes the manufacture and characteristics of flat panels, fabricated shapes, and low pressure shapes made of reinforced plastics. Details on "Strux" cellular cellulose acetate sandwiches. Russell Reinforced Plastics Corp. **(G-225)**

SPRAY PAINTING MACHINES. Bulletin describes two types of machines for semi-automatic spray painting of various plastic items at high speed and low cost. Conforming Matrix Corp. **(G-226)**

GOVERNMENT SPECIFICATIONS FOR STYRENE PRODUCTS. Booklet explains the coding system for federal government specifications and lists products made from "Lustrex" and "Cerex" styrene known to be in the various classes of specifications. Monsanto Chemical Co. **(G-227)**

DRY POLYESTER RESINS. Booklet describes three basic resins used by the reinforced plastics industry for low pressure lamination or coating of Fiberglas, paper, or similar materials and as a component for industrial laminates. Atlas Powder Co. **(G-228)**

ELECTRONIC SEAMER. Booklet describes the Singer electronic seamer for mass production of plastic items and the many attachments which are available for use with it. Singer Sewing Machine Co. **(G-229)**

ANTI-STATICS. Folder contains data on two Merix compounds removing static electricity charges from plastic and other surfaces. Merix Chemical Co. **(G-230)**

ALL HYDRAULIC INJECTION MOLDING MACHINES. Booklet shows the range of products which can be made on HPM 9-, 16-, 32-, and 60-oz. all-hydraulic injection molding machines and lists the specifications of each of these units. The Hydraulic Press Mfg. Co. **(G-231)**

GLASS-FIBER DECORATIVE LAMINATES. Samples of eight colorful, decorative, transparent, and translucent materials with a wide range of applications are contained in a folder issued by Polyplastex United, Inc. **(G-232)**

THERMOPLASTIC KNOBS. Bulletin gives dimensions and other specifications of seven different stock knobs which are molded of Tenite II cellulose acetate butyrate. Arens Controls, Inc. **(G-233)**

MOLDING TEMPERATURE CONTROL. Booklet explains what "Thermolator" control for mold temperature is and explains what it means to molders in terms of elimination of mold temperature variations, reduced scrap, and other advantages. Industrial Mfg. Corp. **(G-234)**

ETHOXYLINE RESINS. General data on "Araldite" ethoxyline resins for bonding metals, ceramics, glass, and plastics and for corrosion resistant potted electrical, and other castings. Ciba Co., Inc. **(G-235)**

AUTOMATIC PAINTING MACHINES. Complete operational details of new automatic spray mask painting machine for decorating plastics are contained in bulletin that includes dimensions, specifications, operating instructions, and description of auxiliary equipment. Sepanski and Associates. **(G-236)**

"GEON 103 EP." Bulletin on a polyvinyl chloride resin which maintains all the advantages of "Geon 101" and "101 EP" but processes at temperatures 10 to 15° F. lower. B. F. Goodrich Chemical Co. **(G-237)**

GLASTIC FOR ELECTRICAL INSULATION. Booklet compares the electrical and mechanical properties of Glastic grade "MM" Fiberglas-polyester reinforced laminates with NEMA grade "C" phenolic laminates and similar materials. The Glastic Corp. **(G-238)**

NEW PAINT RESIN. Bulletin on the specifications, characteristics and formulations of "Pliolite S-5B," a new, lower price improved paint resin. Goodyear Tire & Rubber Co., Inc. **(G-239)**

SARAN PIPE AND FITTINGS. Folder covers applications, chemical resistance, and available varieties of "Mills Plastic" pipe, pipe fittings, tubes, and tube fittings. Elmer E. Mills Plastics, Inc. **(G-240)**

MOLD BASE ASSEMBLIES. The Van Dorn mold base assemblies are illustrated and described in this bulletin. Specifications and prices are included. The Van Dorn Iron Works Co. **(G-241)**

VERTICAL INJECTION MOLDING MACHINE. Bulletin contains specification and description of a 1-oz. vertical injection unit suitable for laboratory requirements and short production runs. Watson-Stillman Co. **(G-242)**

"REZ-N-BRAND" PRODUCTS. Cold dip dyes, hot dip dyes, synthetic enamel coatings, cleaning solvents, and glues and cements for various plastics are described in this booklet. Schwartz Chemical Co., Inc. **(G-243)**

ACETATE MOLDING POWDER. "Ampacet," a thermoplastic cellulose acetate molding powder for injection and extrusion molding, available in crystal-clear transparent and all colors, is discussed. American Molding Powder & Chemical Corp. **(G-244)**

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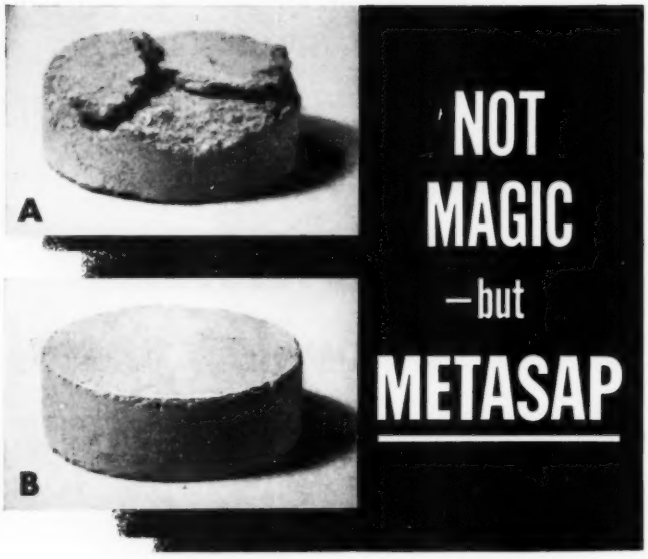


Photo A shows a preform obtained during the course of routine manufacturing operations at the plant of a leading plastics molder. Since delaminated preforms such as this represented too high a percentage of total preform production, a remedy had to be found.

Photo B shows a preform obtained from the same molding compound, handled by the same preform machine, after Metasap Calcium Stearate had been incorporated into the molding powder.

With the addition of the Metasap Calcium Stearate, it was found that preforms could be ejected with *less than* 25% of the pressure formerly required. As a direct result of such reduction in pressure, delamination was practically eliminated.

Many manufacturers today are finding that Metasap Zinc and Calcium Stearates not only assure perfect preforms, but provide other important benefits. For example:

with preforms — molding can be done with machines of less tonnage, and molding materials are conserved.

with finished products — output is increased, because molded pieces are easily and quickly released from molds; and rejects are decreased, because clean-cut, more marketable end-products are obtained. Also, mold life is lengthened, since scoring is avoided.

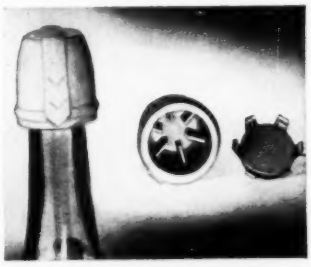
If you stress precision fabrication, especially from intricate molds, you will find these advantages offered by Metasap Zinc and Calcium Stearates exceptionally profitable.

METASAP CHEMICAL COMPANY, Harrison, N. J.
Chicago • Boston • Cedartown, Ga. • Richmond, Calif.

Bottle Cap

SIMPLICITY and efficiency characterize a new styrene re-seal bottle cap manufactured and distributed by Naco Products Co., Los Angeles, Calif. Called the Major Seal, the plastic part of the closure is molded by Franklin Plastics Div., Robinson Industries, Inc., Franklin, Pa., using styrene copolymer supplied by The Dow Chemical Co.

The seal, which is claimed to be the quickest and easiest method of keeping carbonated beverages fresh once the bottles have been opened, consists of the styrene cap, a stainless steel clip, and a rubber gasket. The clip, which is fitted onto the gasket, inserts into the cap and supplies the locking action. When the cap is placed over a bottle neck and slight pressure applied, the steel clip is forced upward in the cap and compressed tightly around the bottle lip. The tension thus applied is strong enough to hold the gasket against the pressure of the carbonated beverage, yet the cap can be easily popped open with a minimum of effort.



Bottle closure (left) is asembled by inserting steel clip and rubber gasket (right) into the styrene shell (center)

An undercut, which is machined into the bottom of the ⅛-in. thick wall of the cap after molding, prevents the steel clip from coming out of the cap. At the top of the cap, six molded-in ribs keep the clip from being pushed in too far.

The height of the cap was estimated to permit its placement in practically all refrigerators. It is available in four colors—red, green, yellow, and ivory—and its only decoration is a simple molded-in raised design.

Copolymers

(*Continued from pp. 71-8*)

the Sill unit permits of spot intensity of heat on various parts of the sheet to be formed, by means of baffles in the heating area.

Lower Prices

As mentioned at the beginning of this article, these sheet styrene copolymers really can compete. With lower priced formulations now coming on the market, even more so—and on long runs. Fred Minikes, Technical Director of Bassons Industries Corp., believes that much of the answer lies in fast operation and good mold design, and that, given those factors, they can compete even with injection molding in some cases on runs of 50,000 and more.

The television tube back made by Bassons for Philco Corp., Philadelphia, Pa., and shown in Fig. 25, illustrates the point. This part is a cup-shaped device designed to protect the inner, narrow end of the picture tube, which projects beyond the cabinet in the back. A comparative study showed that if the piece were injection molded, 360 units per hr. could be produced in a 4-cavity mold on a 40 sec. cycle. By vacuum forming, 30-up in a sheet, 720 units per hr.—fully twice as many—are produced on a 2½ min. cycle. Naturally, the mold cost is far lower.

Multi-cavity vacuum forming is still in its infancy, and new economic comparisons will be available as new jobs are undertaken. But whether the pieces to be formed from styrene copolymers are big and made in one or two cavities, or small and made in multi-cavity molds, the trim cuttings remain an impediment to full economic use of these materials. At least one material maker offers to buy back from its fabricators the clean trim cuttings for reworking, and possibly this idea will be expanded. More probably, the fabricators will find methods of using them for dense compression molding or in some other manner. Today the economics of any sheet styrene copolymer job depends heavily on making trim small as possible.—END

●

Next month: The second article of this series will cover the techniques of forming cellulosic sheet and the applications of the formed pieces.

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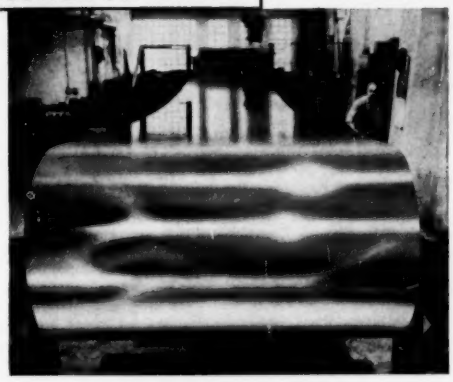

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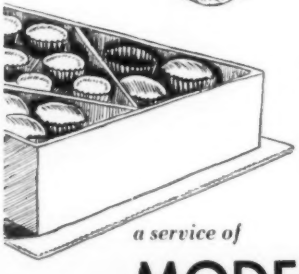
There are forty-four items listed this month—something to interest everyone. The Manufacturer's Literature Page is found on pages 179,180. Turn to it now.



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A Breskin Publication
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Melamine Jars

(*Continued from p. 91*)

weigh 7 or 8 lb., and a steel jar over 4 lb., the melamine unit weighs 1.8 lb., which gives it a decided advantage in hand washing, when as many as 20 jars comprise a service unit. Figuring 10 min. for the washing of a porcelain jar, the total job would involve over 3 hr. washing; with the melamine jars, this time is cut to an hour. Furthermore, plastic jars can be put in automatic dishwashing machines, and since they have no undercuts, they come through spotless and perfectly sanitary.

The light weight of the Melmac is, of course, a decided advantage in reducing packing and shipping costs. It means that the jars are not so likely to be dropped through fumbling—and in any case, they have a terrific break-resistance should fumbling occur.

The design of the series of three jars—a syrup jar, a crushed fruit jar, and a spoon holder—was the result of collaboration between Kenco engineers and John Currier, independent plastics engineer. It involved 3 distinct steps: a) styling of the plastic unit to accurately replace porcelain and stainless steel units in fitting the company's standard stainless steel pumps; b) elimination of undercuts and shortening of corner radii to make for greater ease of cleaning; c) development of deepdraw molding to permit producing parts with minimum of strain.

The resultant job, accepted by the U. S. Navy, has the approval of departments of health of leading cities in the country. Minimum cross section of the pieces is 0.186 in.—a further mark of quality.

The molding job is done by Rathbun Molding Co., Salamanca, N.Y. Good flow of material is accomplished by the use of high-frequency heated preforms.

In sales promotion on the line of plastic jars, Kenco has made good use of reference to the respect in which melamine as a plastic is held by the managements of restaurants, hotels, bars, and drug stores. But recently introduced, the plastic jars have already shown promise of cutting shipping costs and breakage claims in shipment, and of being safer, easier, and more economical to handle at soda fountains.—END

Heat Resistant

(*Continued from pp.* 113-14)

Since 500° F. is frequently beyond the range of large curing ovens, a series of tests was made at other temperatures to determine what length of time would be necessary to give optimum properties. On the basis of these data, the time-temperature conditions listed in Table VI are believed to give maximum strength properties. Since postcure times become very long at tempera-

Table IV—Flexural Strength and Modulus of Vibrin X-1047—181-114 Glass Cloth Laminates[a]

Time of aging at test temperature	*300° F.*		*500° F.*	
	Strength	*Modulus*	*Strength*	*Modulus*
hr.	*p.s.i.*	*10^6 p.s.i.*	*p.s.i.*	*10^6 p.s.i.*
½	30,000	2.5	24,000	2.0
24	38,000	2.5	30,000	2.2
72	43,000	2.4	22,000	2.0
192	45,000	2.2	13,000	1.5

[a] The unaged laminate at room temperature had a flexural strength of 40,000 p.s.i., and a flexural modulus of 2,900,000 p.s.i.

tures below 400° F., it is probable that temperatures in the range of 425° to 500° F. are the most economical temperatures for postcuring the laminates.

Table VII shows the compressive strength properties of the 181-114 laminates, both unpostcured and postcured. Here again postcuring has increased the strength markedly at room temperature and at 300° F. At 500° F. there is less difference. For optimum compressive strength, a resin content of about 37% of the total weight of laminate is indicated.

Table VIII gives other properties of the laminates. The reduction of impact strength by postcuring may or may not be significant. Even 12.5 ft.-lb. per in. of notch is still a tough structure. The increase in weight of

Table V—Flexural Strength and Modulus of Vibrin X-1047—181-114 Glass Cloth Laminates Postcured 3 hr. at 500° F.[a]

Time of aging at test temperature	*300° F.*		*500° F.*	
	Strength	*Modulus*	*Strength*	*Modulus*
hr.	*p.s.i.*	*10^6 p.s.i.*	*p.s.i.*	*10^6 p.s.i.*
½	41,000	2.3	33,000	2.1
24	44,000	2.4	33,000	2.3
72	45,000	2.5	23,000	2.1
192	47,000	2.8	13,000	1.8

[a] The unaged laminate at room temperature had a flexural strength of 50,000 p.s.i. and a flexural modulus of 2,740,000 p.s.i.

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Table VI—Optimum Time-Temperature Conditions for Postcuring Vibrin X-1047 Laminates

Time	*Temp.*
hr.	*°F.*
3	500
8	450
24	400
72	350
240	300

the laminates during 24 hours' immersion in water indicates that study of the effect of moisture on the strength characteristics of the glass laminates would be desirable.

Table IX gives data obtained on laminates made with standard 114 finished 181 fabric and others made with specially finished 181 fabrics prepared by the Garan Chemical Co., Los Angeles, Calif., and the Bjorksten Research Laboratories, Madison, Wis. The data on standard 114 finish laminates shows a slightly lower water absorption than for the laminate listed in Table VIII, but other properties are much as expected and show that water soaking rapidly robs the laminate of 25 to 30% of its strength. The use of the Garan finished cloth shows no favorable effect on water absorption, but does limit the strength loss to 15 to 20 percent. With the Bjorksten finished cloth, water absorption is again unchanged but strength loss even after a 2-hr. boil becomes nil. Two tests are reported for Bjorksten finished cloth. The first laminate, prepared at 15 p.s.i., gave too low a resin content, presumably due to the soft hand of the treated cloth. Reduction of the pressure to 10 p.s.i. did not make the desired change in resin content, since the laminate still had less than 31% resin against a desired 35 to 39% resin content. However, the two laminates both show the same improved wet strength.

This set of laminates was also subjected to heat aging, with the results shown in Table X. The data are pretty much as expected of unpostcured laminates for the 114 and Garan finishes. For the Bjork-

Table VII—Compressive Strength of Vibrin X-1047—181-114 Glass Cloth Laminates

	Compressive strength at		
	Room temp.	*300°*	*500°*
	p.s.i.	*p.s.i.*	*p.s.i.*
Unpostcured	29,000	15,000	———
After 24 hr. at 350°F.	33,000	28,000	15,000

Table VIII—Properties of Vibrin X-1047—181-114 Glass Cloth Laminates

	Unpostcured laminate	*After 3 hr. at 500° F.*
Tensile strength, p.s.i.	28,700	30,700
Izod impact strength, ft.-lb./in. of notch	20	12.5
Rockwell hardness	L123,M120	L122,M119
Water absorption (24 hr.), %	1.2	1.9

sten finished fabric laminates the strengths are unusually good in the 500° F. series tests. The indication is that this finish gives laminates that have not only better wet strength but better high temperature strength. Further tests on postcured laminates with more nearly optimum resin content would be needed to check this observation.

In general, the handling properties of Vibrin X-1047 have been found comparable to standard polyester resins of similar viscosity. If benzoyl peroxide is used as the catalyst, and it has been in most of our laboratory work, it is convenient either to use the paste form Luperco ATC or to pre-wet the granular product with a solvent such as styrene, toluene, or acetone to disintegrate the granules and hasten solution in the resin. The amount of catalyst used is in the same range as for standard resins. Impregnation of cloth by the catalyzed resin is slow because of high viscosity, but commercial methods now in use are believed adequate.

For curing ⅛-in.-thick laminates in the laboratory a platen press has been used. At pressures of 15 p.s.i. the resin content was about 37% with standard 181-114. Use of other fabrics, such as the Bjorksten treated cloth, or of different shapes may alter the pressure needed. Cure was effected by gradually raising platen temperature from 185° F. to 250° F. during the 30-min. cure. This cycle resulted in initiation of cure at the lower temperature and then as the temperature was raised, the heat of the cure reaction aided in carrying the entire laminate to the final temperature of 250° F. With thicker sections, such as ¼ in., the laminate was held at 185° F. for a longer time so that the resin would gel before the temperature was raised. If the laminate gelled at too high a temperature, reaction heat was sometimes excessive and inferior laminates resulted due to scorching or burning in the center.—END

Table IX—Effects of Finishes on Wet Strength of Vibrin X-1047—181 Glass Fabric Laminates[a]

Finish	*114*	*Garan*	*Bjorksten*	*Bjorksten*
Cure pressure, p.s.i.	*15*	*15*	*15*	*10*
Resin content, %	35	38	29	30.5
Water absorption (24 hr. at 28° C.), %	0.90	0.99	0.85	0.92
Flexural strength				
Dry, p.s.i.	47,400	46,500	42,800	52,000
After 24 hr. in water at 28° C.				
Strength, p.s.i.	34,700	38,200	46,300	45,900
Strength retained, %	73	82	108	89
After 2 hr. in boiling water				
Strength, p.s.i.	33,900	39,600	43,000	51,900
Strength retained, %	72	85	100	100

[a] Laminates were not postcured.

Table X—Effects of Finishes on Flexural Strengths at High Temperatures of Vibrin X-1047—181 Glass Fabric Laminates

	Flexural strengths of laminates			
Finish	*114*	*Garan*	*Bjorksten*	*Bjorksten*
Cure pressure, p.s.i.	*15*	*15*	*15*	*10*
	p.s.i.	*p.s.i.*	*p.s.i.*	*p.s.i.*
At room temp., unpostcured	47,400	46,500	42,800	52,000
At 300° F. after 0.5 hr.	29,000	29,000	28,000	31,000
" " 24 hr.	38,000	41,000	35,000	39,000
" " 72 hr.	43,000	45,000	38,000	43,000
" " 192 hr.	43,000	48,000	42,000	49,000
At 500° F. after 0.5 hr.	22,000	26,000	24,000	28,000
" " 24 hr.	28,000	31,000	43,000	45,000
" " 72 hr.	20,000	20,000	28,000	30,000
" " 192 hr.	11,000	10,000	14,000	15,000

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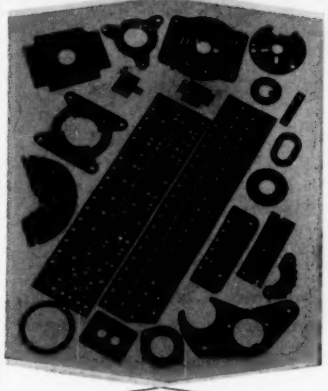

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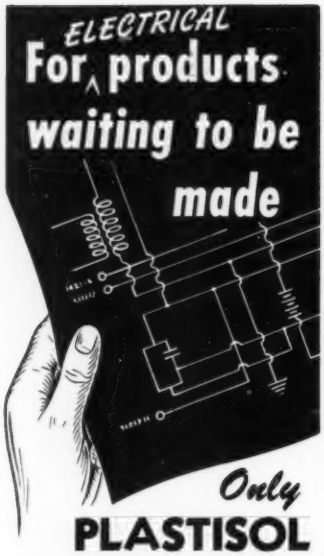

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Vinyl Silane

(*Continued from p. 124*)

temperature to prevent condensation. 3) Sizing by bringing the vapor into contact with the fabric. Sufficient vapor must be available to insure thorough application. 4) Washing the sized fabric on emergence from the treating chamber. 5) Drying at 50 to 70° C.

Table I shows the retention of flexural strength after immersion for 3 hr. in boiling water by laminates made of glass fabrics treated with vinyltrichlorosilane size and with the 114 size, respectively.

The preceding results were on a laboratory-scale basis. They indicated the advisability of proceeding with the vinyltrichlorosilane sizing on a larger scale. Consequently pilot plant operations were initiated and a study was made of both liquid and gaseous phase processing. Table II summarizes the results for both types of processing in these larger scale operations. It seems important that in gas phase, *without* the beta-chloroallyl alcohol, we did succeed in matching the value obtained in liquid phase with this ingredient.

In conclusion, based on our pilot plant operations experience, the following information might be of value in a consideration of large scale plant operation:

1) The sizing can be applied continuously, from either solvent or gas phase, as fast as our pilot equipment is capable of moving. For the gas phase this is about 500 ft. per min., and for the liquid phase about 60 ft. per minute. From all indications, we believe that the adsorption of the silane is very rapid and practically instantaneous. So far as the speed of adsorption is concerned, it would seem possible to apply the sizing directly as the fibers are made.

2) In liquid phase processing, i.e., the sizing in solution, an adsorption of 2.5% by weight of silane on the glass cloth gave optimum results. In the gaseous phase, much greater economy was attained. By direct weighing of untreated and vapor phase treated samples, it was not possible to observe any appreciable difference in weight. Many of the treated samples were lighter than the untreated samples, perhaps because of loss of some adsorbed moisture. We can safely say that the adsorbed silane in these cases was less than 1% on the weight of the glass, probably much less than 1 percent. Using an estimated silane cost of $1 per lb. (the quantity production price indicated to us by Linde Air Products Co.), this would mean a material cost of less than 1 cent per lb. of glass fiber or fabric. In continuous production, the cost of treatment should be less than the material cost, bringing the total cost to less than 2 cents per pound. The desirable mode of treatment would be at the point where the fibers are made; otherwise, a 112 finish will be a requisite.

3) The retention of flexural strength after a 3-hr. boil, by vapor phase treatment, was equal to that attained by liquid phase treatment. In the vapor phase treatment, moreover, it was not necessary to employ beta-chloroallyl alcohol to attain this result.—END

Table II—Optimum Flexural Strengths of Glass Tape Sized in Pilot Plant Processing[a]

Sizing	Flexural Strength: Dry	Flexural Strength: After 3-hr. boil	Retention of dry strength after 3-hr. boil
	10^3 p.s.i.	10^3 p.s.i.	%
Liquid Phase			
a) Vinyltrichlorosilane and beta-chloroallyl alcohol in xylol	62.7	56.7	91
b) 3.5% solution of vinyltrichlorosilane in xylol	56.7	54.8	97
Vapor Phase			
Vinyltrichlorosilane	62.9	57.1	91

[a] The glass tape was 225 filament, 7 mil. The data above are therefore not directly comparable with those in Table I.

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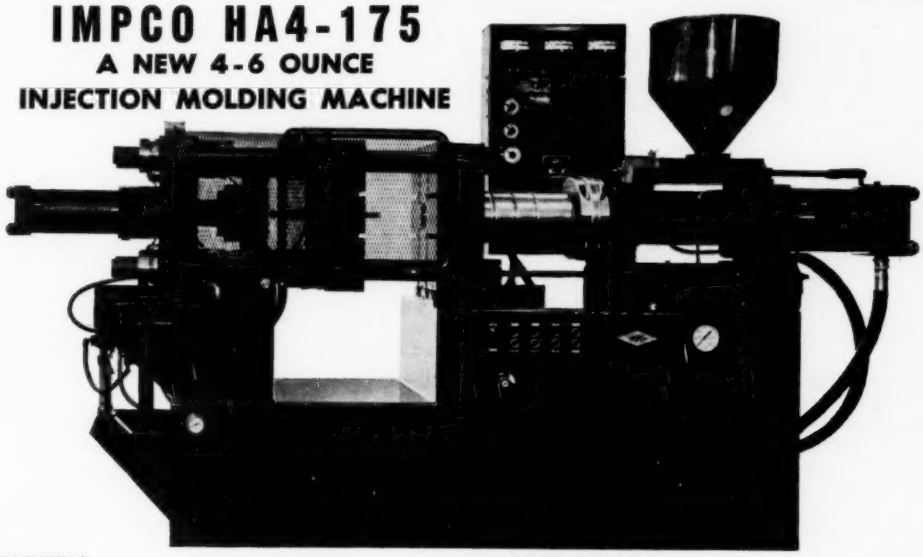

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Machine to cycle (dry run)—8 minute.
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THE PLASTISCOPE*

NEWS AND INTERPRETATIONS OF THE NEWS

By R. L. Van Boskirk

High Impact Styrene

A NEW styrene formulation designed to bridge the gap between regular and high impact styrenes, both property-wise and cost-wise, has been announced by the Chemical Div. of Koppers Co., Inc.

This modified styrene has a marked increase in toughness over regular styrene and costs only 1¢ a lb. more in colors.

The new product has been named Koppers MC 401 and is available in all standard opaque colors but not in crystal or translucent. Heat resistance is somewhat improved over that of the fully modified Koppers styrenes MC 185 and MC 301, and it is claimed that it molds easier than the more shock resistant styrenes, though not quite as easily as regular styrene.

It is expected to be valuable in the manufacture of housewares, appliances, battery cases, air conditioning housings, radio and television components, refrigerator parts, packaging items, toys, and others.

Vinyl-Glass Screen Cloth

VINYL coated multi-filament glass yarn will soon be ready for sale to screening producers by The Dastran Co., Rockville, Md. The material is now under test by U. S. Army Engineers. The price is expected to be less than copper or bronze screen cloth and in about the same range as aluminum or saran. This type screen cloth will not corrode; does not stain the paint on trim around a window; and will not support combustion.

The tensile strength of the vinyl-glass yarn is extremely high and elongation is only 5%, which is said to be a much lower percentage than other plastic types.

This new development is probably a forerunner of many other uses that will eventually develop from a combination of unidirectional glass fibers and vinyl coating. There is already a Venetian blind tape made from woven vinyl coated glass yarn filaments on the market and another made from glass yarn embedded in vinyl tape. Upholstery, drapes, and presently undreamed of products are expected to follow when operational methods are perfected.

Coated Fabric Shipments Rise

SHIPMENTS of vinyl-coated fabric by companies reporting to the Plastics Coating and Film Association in the first quarter of 1952 were 10,600,000 linear yd., almost 500,000 yd. more than the first quarter of 1951. This volume is thought to represent about 60% of the total industry production.

Film and sheeting is the only branch of the plastics industry coming to our attention which has reported more shipments in 1952 than in 1951—no one has yet produced an answer to the reason for this upward trend in contrast to a prevalent downward trend in other lines. Operators state it is definitely not a military goods increase—perhaps it is an indication of the growing importance of plastisols which are particularly adaptable for coating operations.

Sheeting (or unsupported vinyl film over 10 mils thick) shipments by the same group were 14,600,000 sq. yd. compared to 15,150,000 a year ago in the first quarter, but March shipments of 6,000,000 sq. yd. reached the highest monthly level ever reported. The sheeting figures represent somewhere near 80% of total industry production for sheeting. The Association reports that inventories have been worked off and that current orders all call for immediate delivery.

The newly organized Film Section of the Association held its first meeting to concentrate on plans for simplified practices and development of methods for preparing industry statistics that may permit reporting of shipments according to thickness of gage; dry resin weight as well as quantity by dollars and square yards; and possibly separation into plain, embossed, printed, and printed and embossed types.

The Committee on Simplified Practices is working on plans that would determine procedure for setting standards of measurement such as whether quantity should be determined by poundage of film or yardage of material; minimum quantity orders; weight of rolls; standard widths; standard colors; size of cores; and other trade practice policies which would establish mutual understanding between customer and supplier and help to eliminate a plethora of sizes, weights, etc., that are not only confusing but costly to both producer and customer.

Plastic Pipe for Water

SOME idea of the constantly growing extent to which plastic pipe is used, both geographically and industrially, was indicated last week when the Busada Mfg. Corp., Inc., 58-99 54th St., Maspeth, Long Island, N.Y., made two shipments of butyrate pipe to Cuba and Louisiana.

Both of these shipments were to be used in water systems. The Cuban pipe, presumably for sugar

Bulletin Discontinued

The *Modern Plastics* Bulletin which has been appearing in this magazine since Korea was invaded has been discontinued for an indefinite period. Since the Bulletin came into being as a means of keeping our readers informed on the status of scarce plastics materials and since scarcities have now vanished, there is no longer a need for that particular type of information. If circumstances should again change in the future, the Bulletin will be revived. Future comment on raw materials and Washington news that pertains to plastics will appear in The Plastiscope or other sections of the magazine as the occasion warrants.

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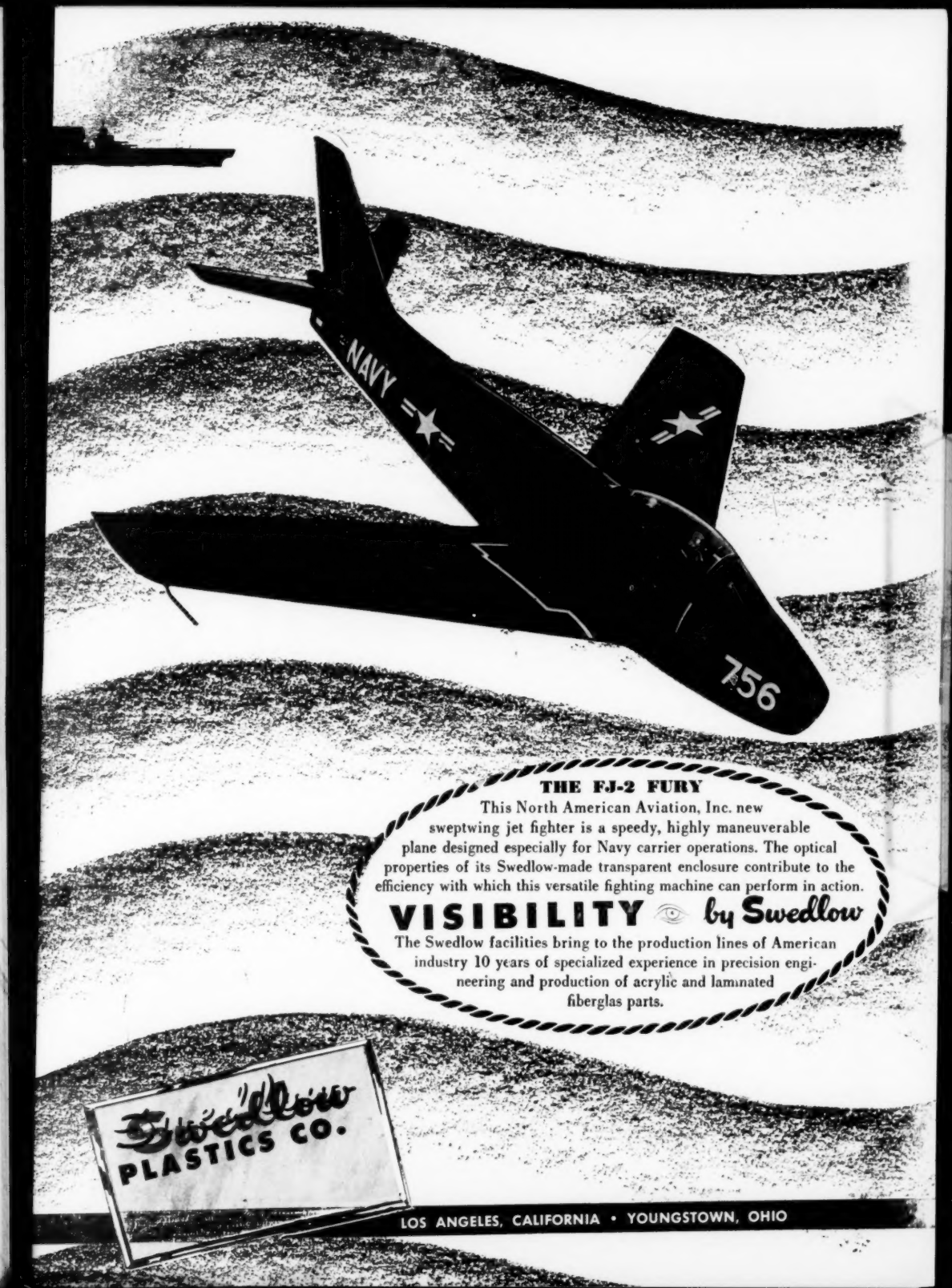
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mills, was 1 in. iron pipe size and will take at least 150 p.s.i. The wall thickness was 0.133 inches.

The pipe going to Louisiana was 1¼ in. pipe to be used for air conditioning and had a wall thickness of 0.140 inches.

Mr. John Boosahda, manager of the Busada Mfg. Corp., has vigorous opinions on plastics pipe sizes; he is strongly in favor of a policy that would encourage extruders to manufacture their pipe in the same sizes as iron pipe. He believes that he is one of the few producers making butyrate pipe in iron pipe sizes. He claims that the confusion arising from different sizes in iron and plastics pipe, plus the fittings problem, will take a long time to overcome unless remedial action is taken at once. He points out that polyethylene pipe is rather generally made in iron pipe size, but for one reason or another extruders have been making other types of plastics pipe with relatively thin walls when they could get greater strength by using the same thicknesses found in iron pipe.

Mr. Boosahda further insists that the use of thin walled plastics pipe when thicker walls ought to be used will degrade industry products and result in the same kind of complaints that have hampered other sections of the plastics industry when the market was flooded with inferior products.

Armed Force Display

INDUSTRIAL exhibits of products procured by the Corps of Engineers are on display in 18 field offices throughout the United States. The displays afford small business firms an opportunity to examine at first hand items of Engineer equipment and their component parts. Specifications and plans can be seen at Engineer field offices.

The locations may be ascertained by calling the Division or District Engineer, Corps of Engineers, Department of the Army, in the following cities: Boston, New York, Buffalo, Philadelphia, Pittsburgh, Atlanta, Cincinnati, Louisville, Chicago, Rock Island, Detroit, Milwaukee, St. Paul, St. Louis, Fort Worth, Los Angeles, San Francisco, and Seattle.

Certificates of Necessity

FOLLOWING is a list of Certificates of Necessity that have been granted to various companies for materials of direct or indirect interest to the plastics industry. These have been granted since the list that was published in this magazine last month.

Certificates of Necessity

Company	*Product*	*Amount Certified*	*Percentage Allowed*
Shell Oil Co. Wilmington, Calif.	Benzene	$100,000	90
The Vogel Mfg. Co. Bridgeport, Conn.	Components for Signal Corps Wire	22,000	45
Shawinigan Resins Corp. Springfield, Mass.	Polyvinyl formal resin	332,250	50
Allied Chemical & Dye Corp. Buffalo, N. Y.	Maleic acid anhydride and fumaric acid	4,551,500	50
Teal Molding Co., Inc. New Haven, Conn.	Plastic parts for military end items	31,000	45
Industrial Tape Corp. New Brunswick, N. J.	Industrial tapes for armed services	1,301,010	65
Taylor Fibre Co. Norristown, Pa.	Vulcanized fiber	91,800	50
The Neville Co. Neville Island, Pa.	Benzol, toluol, and naphthalene	442,700	35
The Polymer Corp. Reading, Pa. Reading, Pa.	Nylon strip and tubing for military end items Nylon and Teflon rod strip tubing	19,292 88,503	45 60
National Engineering Products, Inc. Washington, D. C.	Electrical plastic sealer for armed services	86,448	55
Minnesota Mining & Mfg. Co. Chicago, Ill.	Industrial tape for armed services	9,030,000	65
Coast Mfg. & Supply Co. Livermore, Calif. Livermore, Calif.	Fiberglass cloth for armed services Fiberglass cloth for aircraft	38,018 14,366	50 50
American Polymer Corp. Peabody, Mass.	Plastics	89,400	55
Monsanto Chemical Co. Springfield, Mass. Muscle Shoals, Ala.	Formaldehyde solutions Calcium carbide	669,000 3,975,000	55 50
Leconte Plastics Co., Inc. Farmingdale, N. Y.	Reinforced plastics for aircraft parts	85,585	45
Auburn Button Works, Inc. Auburn, N. Y.	Plastic parts for naval ordnance	63,446	50
Heyden Chemical Corp. Garfield, N. J.	Pentaerythritol	1,207,465	65
American Cyanamid Co. Bridgeville, Pa.	Phthalic anhydride	6,165,000	30
Penn-Plastics Corp. Glenside, Pa.	Molded plastic parts for military end items	17,350	45
Continental-Diamond Fibre Co. Newark, Del. Bridgeport, Pa. Valparaiso, Ind.	Laminated plastics sheets Vulcanized fiber sheets Laminated plastics	51,708 39,734 1,147,200	50 50 50
The Patent Button Co. of Tenn., Inc. Knoxville, Tenn.	Ordnance	12,000	65
The Borden Co. Demopolis, Ala.	Formaldehyde	1,028,610	55
Glass Fibers, Inc. Defiance, Ohio	Fibrous glass material	156,100	65
Air Reduction Co., Inc. Louisville, Ky.	Calcium carbide	158,000	50
Union Carbide & Carbon Corp. Marietta, Ohio	Phenolic resins	5,740,000	55
Acme Resin Corp. Chicago, Ill.	Synthetic resins for military end items	317,935	55
Midwest Carbide Corp. Mayes County, Okla.	Calcium carbide	2,027,000	50
Zenith Plastics Co. Gardena, Calif. Gardena, Calif.	Plastic parts for ordnance Plastics for aircraft parts	15,400 95,000	45 45
Commercial Solvents Corp. Agnew, Calif. Seattle, Wash.	Formaldehyde Formaldehyde	450,100 723,900	55 55
Dumont Corp. San Rafael, Calif.	Reinforced plastics	6,674	45
Pacific Carbide & Alloys Co. Portland, Ore.	Calcium carbide	91,513	50

Plastic Pleasure Boats

OBSERVERS report that the boat yards in the Sheepshead Bay-Coney Island area in Brooklyn where plastic row boats can be obtained are enjoying considerably better business than their competitors. Customers ask first for a plastic boat and claim that they are preferable because of their light weight

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Flex-Appeal

IN YOUR VINYL PLASTIC FILMS WITH *Baker Plasticizers*

The ideal plasticizer should impart flexibility that persists over a wide range of temperatures. It should give film pliability, softness, drape, or hand at all times. To an outstanding degree the plasticizers listed below impart these qualities to polyvinyl chloride type resins. They give flexibility that is particularly effective at subzero temperatures.

And these Baker plasticizers offer a *plus value*. They are effective processing aids, acting as anti-stick agents during calendering operations. The hot PVC films are readily released from the rolls, making a high production rate possible.

PRODUCT	CHEMICAL NATURE	SPECIFIC GRAVITY 25°C/25°C	VISCOSITY (Poises) 25°C	ACID NO.
RICINOLEATES				
Flexricin® P-4	Methyl Acetyl Ricinoleate	.937	.22	2.2
Flexricin P-4C	Methyl "Cellosolve" Acetyl Ricinoleate	.960	.24	2.8
Flexricin P-6	Butyl Acetyl Ricinoleate	.928	.23	2.2
Flexricin P-8	Glyceryl Tri (Acetyl Ricinoleate)	.967	2.3	2.0
PG-16	Butyl Acetyl Polyricinoleate	.913	.21	2.6
ACETOXYSTEARATES				
Paricin® 4	Methyl Acetoxystearate	.934	22	2.4
Paricin 4C	Methyl "Cellosolve" Acetoxystearate	.953	32	3.6
Paricin 6	Butyl Acetoxystearate	.924	32	4.0

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and maneuverability. As a result, the yard owners have increased the rental price on plastic row boats over wooden row boats. The rental is $3 a day for wooden boats and $4 for plastic.

Surface Inks

COMPLETION of its new line of surface inks has been announced by Peerless Printing Ink Co., Ontario & Janney Streets, Philadelphia, Pa. These vinyl inks for use in surface printing on vinyl films are characterized by clean, brilliant colors; fast, complete dry; and ease of working. They have the ability to stay open longer than conventional inks on cloth and metal, but dry faster than usual on film.

Junior's Interest

A PARAGRAPH in this column two months ago about the desirability of interesting teen agers in plastics so that more of them would be interested in the plastics industry as a future brought a response from Coventry Ware, Inc., Barberton, Ohio, pointing out another way of interesting young people in plastics. This involves a kit containing aluminum foil for the mold and pattern blocks for seven subjects, together with a plastisol compound which children can use to mold a variety of objects such as lapel pins, coasters, book markers, fishing lures, and so on.

The end products are in no sense limited by the seven patterns provided in the kit because new patterns can be made, and the aluminum foil pressed over them to make a mold. The products can be cured in the kitchen oven.

What Does Packaging Need?

THE packaging industry is hopeful that the plastics industry will develop films that will withstand high sterilization temperatures as flexible substitutes for use with processed foods now packaged in metal and glass, according to R. H. Walters of General Foods Corp., who spoke before the Consulting Chemists Association in New York City last month. Among other items needed, the listing of which he hoped would stimulate thinking in the plastics industry, are a package with the convenience and economy of a bag and the oxygen impermeability of a tin can; a film that will retain its desirable characteristics through the extreme temperature ranges from deep freeze to hot boxcars in the summer; a completely grease-proof coating for carton board; and something that will give the impermeability of foil at the price of newsprint.

Thermoset Can Coating

A NEW phenolic coating for beer and food cans is being introduced by Reichhold Chemicals, Inc., 601 Woodward Heights Blvd., Detroit, Mich. The new coating has remarkable flexibility and has been especially developed as a coating for metal that must undergo severe bending.

Gas Cylinders

THE U. S. Navy has contracted two development jobs of 12 units each for polyester glass compressed gas cylinders. The cylinders are to be standard size of 50-lb. capacity, must be non-magnetic, and must withstand 2000 p.s.i.

Flights of Fancy

GUESSING or speculating on plastics consumption is a lot of fun but not very accurate. We are indebted to a contemporary, *Australian Plastics*, Feb. 1952, who in turn credit their information to a Hungarian trade journal for one of the most spectacular guesses that has come to our attention. The Hungarian paper claims that annual consumption of plastics in the Soviet Union is 3 kilograms per head, or somewhat higher than in the U.S.A. A kilogram is equal to 2.2046 pound. Population of Russia, exclusive of satellites, is estimated to have been 193 million in 1946, and if that has grown to as much as 200 million today, the above figure would mean that Russia is consuming something like 1,400,000,000 lb. of plastics a year, or roughly 7 lb. per head. No one knows, of course, whether or not the Hungarian story also included population of the satellite states. Then, too, it is also possible that the Russians included synthetic fibers, synthetic rubber, and other synthetics not customarily included in plastics production statistics in this country.

U.S. consumption in 1951 was about 2,100,000,000 lb., including surface coatings but not including fibers, synthetic rubber, photo film, and a few other miscellaneous. Based on a population of 150 million people, this would mean that the per capita consumption of plastics and synthetic resins in the U.S., exclusive of the items named above, would be something like 14 lb. for 1951.

From the above figures, it would seem that Russians are either ignorant of what's going on in the U.S. or are stretching their point a bit. But even so, there are few people in the U.S. who believe that as much as 1,400,000,000 lb. of plastics are being consumed in Russia each year.

Insurance Risks

LIFE insurance underwriters were advised to consider the 100,000 employees of the plastics industry as good risks, in an industry-wide report by R. K. Mueller, assistant general manager of Monsanto Chemical Co.'s Plastics Division.

Mr. Mueller said that the average employee in the plastics industry lost from 3.9 to 6 days a year, including all personal illness as compared to the national average of 8 to 10 days a year. "The relative infrequence of industrial disease due to toxic exposures in the plastics industry," he continued, "is due to the positive program aimed at prevention of such conditions." He said that categories used by insurance companies for underwriting plastics industry occupations are frequently out of date by at least 20 years.

Polyvinyl Alcohol

FROM the large number of possible combinations of viscosity and degree of hydrolysis, American Monomer Corp., Leominster, Mass., has selected the six most widely used types of polyvinyl alcohol for manufacture under the trade name "Lemol." All grades provide tough, water soluble resins combining high tensile strength, adhesiveness, and

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We have available over 150,000 sq. ft. of floor space devoted exclusively to the processing of plastics — virgin and scrap — resinous materials or by-products.

We specialize in the reduction to small particles — to your most exacting specifications — of all lumps, blocks, mill ends, bleeder waste — regardless of size and whether rigid or soft.

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tear-resistance with extreme inertness to aging, oxidation, and bacterial action. Complete data on the six grades will be furnished by the company.

The company has also announced the addition of *n*-butyl acrylate to its list of commercially available monomers. It is useful in the production of polymers and copolymers for low temperature rubbers, adhesives, protective coatings, etc., as well as an intermediate in the production of plasticizers.

Phenolic Laminating Varnish

AN improved low cost, unextended phenolic laminating varnish, Synco 115, has been announced by Snyder Chemical Corp., Bethel, Conn. Its primary advantages are faster treating, low stack loss, freedom from curling, and excellent flow within minimum pick up and low volatile content ranges. Synco 115 gives hard, tough laminates having good dimensional and water resistant properties as determined by NEMA and ASTM Test Methods.

Cement Dispenser

TO meet a widespread demand by industrial users of Rez-N-Glue for a convenient dispenser, Schwartz Chemical Co., Inc., 326 W. 70 St., New York, N.Y., is now making its all-purpose, vinyl-base cement available in 3-oz. tubes. The tube has a long narrow tip which can reach into small depressed areas, and has an air-tight, screw-eye closure which is said to assure indefinite shelf-life. The cement, heretofore available only in gallon cans and large drums, is used to cement dissimilar plastics and plastics to non-plastics.

Thin Fluorocarbon Film

PRODUCTION of thin Teflon film in 400-ft. spools for use in high temperature electrical components has been announced by Dilectrix Co., 211-48 Jamaica Ave., Queens Village, N.Y. It is available in thicknesses of 0.00025, 0.0005, 0.001, and 0.002 in. and widths up to 5 inches. Dielectric strengths as high as 5000 volts per mil have been measured for the ½-mil film. Suggested uses for the film include transformer windings, cable and wire wrapping, high-temperature condensers, and miniaturization applications.

Economy-Priced Upholstery Fabric

IN answer to the demand for low-priced supported plastics, Du Pont's Fabric Div. has announced its new Pacemaker grade of Fabrilite supported vinyl upholstery. The Pacemaker grade possesses the qualities of the Fabrilite line—resistance to tearing, abrasion, and sagging, and flexibility at low temperatures. It is available in top grain leather effects in seven colors.

Chemist Honored

THE John Scott Award, bestowed by the City of Philadelphia on "ingenious men and women who shall make useful inventions," was given to Dr. Roy J. Plunkett, Organic Chemicals Dept., E.I. du Pont de Nemours & Co., Inc., for his discovery of Teflon tetrafluoroethylene resin. Presentation of the award—$1000 and a copper medal—was made by Ernest T. Trigg, chairman of the advisory committee for the award.

Dr. Plunkett joined Du Pont's Jackson Laboratory in 1936 and discovered Teflon while doing research on fluorocarbon refrigerants.

General Purpose Plasticizer

TANK car quantities of Flexol CC-55, a new general-purpose primary plasticizer for vinyl chloride resins, are now available from Carbide and Carbon Chemicals Co. Principle feature of the new product is its across-the-board utility in all major vinyl compounding; it is a plasticizer for calendered and extruded goods, as well as organosols and plastisols, and its excellent light and heat stability characteristics make it useful in clear and pigmented products.

CC-55 has excellent compatibility with the vinyl chloride resins and with many coating resins and polymers. Its compatibility is unaffected by ultra-violet light and high humidity at high temperatures. Compounds plasticized with CC-55 are resistant to water leaching and have good low temperature flexibility. Plastisols based on CC-55 have very low viscosities and excellent storage stability.

New Elastomer

SMALL quantities of a new synthetic elastomer are being produced in a Du Pont pilot plant at Belle, W.Va., for evaluation in applications in the automobile, wire and cable, protective coating, mechanical goods, and other industries. The elastomer—Hypalon S-2—is made by treating polyethylene with chlorine and sulfur dioxide. The resulting product is a white, spongy material that can be readily compounded and processed in conventional rubber machinery.

One of its outstanding properties, according to a company report, is complete resistance to ozone, which causes deterioration of natural and synthetic rubbers. It can be blended with natural and synthetic rubbers and imparts to the blends many of its own properties, including resistance to abrasion, heat, weather, as well as greater stiffness. Its electrical properties, comparable with those of other chlorinated elastomers, is adequate for low voltage applications.

High-Frequency Equipment

ENGINEERING of a new shielded booth and electric filter to meet the FCC regulation that requires shielding of high-frequency equipment after June 30, 1952, (see MODERN PLASTICS, Sept. 1951, p. 101), has been announced by Kabar Mfg. Corp. Complete plans of the booth and filter are available on request to the company, 1907 White Plains Rd., New York, N.Y.

Pipe Fittings

UNDER the trade name of Telsco, Texas Lawn Sprinkler Co., Inc., 5422 Redfield St., Dallas, Texas, is marketing a complete new line of malleable iron threadless fittings for joining standard-size plastic or steel pipe. Ten different types and 111 different sizes of fittings are being offered.

Fittings are factory-assembled and ready to use on plain-end pipe, without threading. The pipe end is

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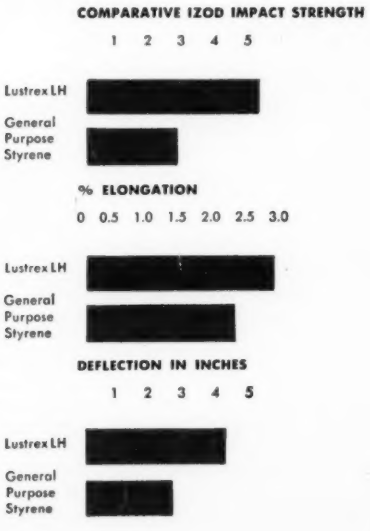

Lustrex LH, Monsanto's new improved impact-strength styrene, enables you to produce a better product—and get the jump on competition.

Lustrex LH has up to twice the impact strength of general purpose styrene . . . yet it costs only a penny more. It has higher heat resistance, too, and the desirable gloss of general purpose styrene.

Lustrex LH enables you to *upgrade* your industrial or consumer products. Or, Lustrex LH can be used in many applications in place of higher-priced material . . . giving you a price advantage. Either way, you make new friends . . . win more business.

Lustrex LH has excellent moldability; and, it is available in eleven colors (including refrigerator white).

Monsanto Chemical Company, Plastics Division, Room 2619, Springfield 2, Mass. Lustrex: Reg. U. S. Pat. Off.

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simply inserted into the fitting, and fitting end nuts are tightened with an ordinary wrench.

The manufacturer points out that the fittings are suitable for use in original plumbing installations or repairs, in industrial piping, chemical plants, gas piping, lawn sprinkler systems, machinery, appliances, or for any small diameter piping.

Elastic-Vinyl Upholstery

AN upholstery material that can be formed around corners and curves without using pleats or folds is now in production by Textileather Corp., Toledo, Ohio. The material, called Elastic Tolavon, consists of a vinyl film fused to an elastic fabric backing to give stretchability.

Elastic Tolavon is fast and easy to tailor with regular tools, and has the additional advantage of producing smooth finished contours without the wrinkles that become wear points when more rigid materials are used. Textileather is producing it initially in ten colors for stock distribution; other colors will be added for production orders.

Calendered Tape

EXCELLENT chemical resistance and high dielectric strength are exhibited by a new calendered Temflex 105 tape recently announced by Irvington Varnish & Insulator Co., Irvington, N.J. The calendering process assures uniformity of thickness, which virtually eliminates internal stresses caused by uneven tensions in winding, according to the manufacturer.

Temflex 105's high tensile strength makes its use on taping machines effective and, although the material is not easily stretched, it possesses good ultimate elongation. It has good resistance to oil, suggesting its use in transformers, Diesel equipment.

Polyester Laminated Sheets

PRODUCTION of Iolyte polyester laminated sheets in continuous strips of any desired length, in thicknesses of from 8 mils to ¼ in. or over, has been announced by Industrial Organics Corp., 59-31 54 St., Maspeth, N.Y. Iolyte laminates may be filled with Fiberglas cloth or mat, cotton cloth, Orlon, nylon, or other synthetic fibers.

The material, which has the tensile strength of steel, pound for pound, weighs five times less than steel, and is easily machined, sawed, drilled, or nailed. It can withstand continuous exposure to temperatures up to 350° F., has low water absorption, good electrical properties, and is highly resistant to chemicals.

Iolyte can be fabricated into pipe, ducts, or molding shapes, and the manufacturer points out that its properties make it useful for structural and decorative forms, and for applications in the electrical, electronic, radio, chemical, furniture, machinery, automobile, and aircraft fields.

Resilient Polyester

DEVELOPMENT of Interchemical 433 Resilient Polyester was undertaken by Interchemical Corp., 224 McWhorter St., Newark, N.J., to meet the need for a polyester resin with adequate resilience which would minimize warpage, improve shock resistance, and eliminate surface crazing in parts under stress without appreciable sacrifice in heat distortion temperature properties.

Interchemical 433 has low viscosity for easy mixing with filler pigments and low styrene content for good strength properties. If the resin is not rigid enough, it can be blended with any Interchemical standard rigid polyester. Use of the material is especially recommended for large thin sections where warping is a problem and whenever resilience is important and a low heat distortion temperature cannot be tolerated.

EXPANSION

Reichhold Chemicals, Inc., has opened a new technical service laboratory at the company's Midwest Div. plant at 7738 West 61 Place, Summit, Ill. Offices for management, sales, and office personnel, formerly located at 122 S. Michigan Ave., have been moved to the new site.

Johnson Plastic Corp., Chagrin Falls, Ohio, has completed a 22,000 sq. ft. expansion at its main plant which will house a new molding department to increase production.

Bilnor Corp., manufacturer of inflatable products, will increase its manufacturing facilities and move its factory and offices to a larger plant at Metropolitan and Morgan Avenues, Brooklyn 11, N. Y., by August 1. The company offices are now located at 53-06 Grand Ave., Maspeth, N. Y.

Standard Oil Co. (Indiana) has named The M. W. Kellogg Co. to construct a large iso-octyl alcohol plant at its Wood River, Ill., refinery. Iso-octyl alcohol, used in the manufacture of plasticizers, will be produced at an annual rate of about 10 million pounds.

Catalin Corp. of America has designated Blaw-Knox Co. to design and construct a plant for the production of polystyrene at Calumet City, Ill. The new unit will have facilities for producing 1,200,000 lb. of dye color powder and standard extruded pellets of styrene a month.

Ferro Corp. has announced that four new factory buildings at Nashville, Tenn., for the production of glass fiber are expected to be in operation by this spring.

The Harwick Standard Chemical Co. has opened its re-built Akron, Ohio, plant which was destroyed by fire in May, 1951. The plant, re-built at a cost of about $300,000, provides additional laboratory and storage space.

Hercules Powder Co. will start construction late this year on its $8 million hydrocarbon chemicals plant to be situated on a 275-acre tract near Gibbstown, N.J. The unit will produce phenol, para-cresol, acetone, and cymene alcohols.

American Cyanamid Co. has received a Certificate of Necessity to build a plant for the production of chemicals from natural gas which will be located on a 600-acre site in Jefferson Parish, La., near New Orleans. The new plant, which represents an investment of about $50 million, will produce ammonia, acetylene, hydrocyanic acid, and derivatives of these products, among them acrylonitrile and ammonium sulfate.

United Wallpaper, Inc., Merchandise Mart, Chicago 54, Ill., has cre-

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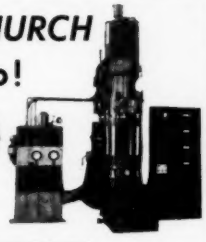

Visit our booth at the ISA Convention in Cleveland, September 8-12.

PROPORTIONING CONTROLLERS ON ALL FOUR ZONES

Another manufacturer of plastic moulding equipment, The Jackson & Church Company of Saginaw, Michigan, has chosen Taco West controllers for their new 6 oz. pre-plasticizing moulding press.

The Gardsman Model JP Pyrometric Proportioning Controllers by Taco West automatically adjust the ratio of power "on" and "off" over a given time cycle to maintain any desired temperature setting with the index pointer. By anticipating temperature changes the JP straightens out the temperature control curve and gives the fine control needed in exacting applications. Write for Bulletin JP-1

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ated a new Color Div. for the manufacture of a full line of colors for paper coatings, wallpapers, and rubber base or latex type paints. Research in the new division is concerned with the development of pigments applicable for the plastics, rubber, and printing ink industries.

Monsanto Canada Ltd. has purchased all the outstanding common stock of **Barringham Rubber & Plastics Co. Ltd.**, Oakville, Ont., manufacturer of vinyl chloride, and a wide range of plastic-coated fabrics and rubber products. Barringham will be operated as a subsidiary of Monsanto Canada and will supply Ultron vinyl chloride resins and film to Canadian users.

Blaw-Knox Co.'s Chemical Plants Div. was awarded a contract by Marshall-Eclipse Div. of Bendix Aviation Corp. to build a special synthetic resin plant at Green Island (Troy), N.Y. The new plant, which consists of two large production units, will produce primary phenolic resins as well as resins of other types. It is expected to be completed by the latter part of 1952.

The Dow Chemical Co. has announced that new facilities at Midland, Mich., for production of polyvinyl chloride resins are expected to be completed and in operation early this summer.

Shellmar Products Corp., Mt. Vernon, Ohio, has assumed ownership of 99% of the **Standard Printing Co.**, Columbus, Ga., in a share-for-share exchange of common stock. The Standard plant, to be operated under its present management as a Shellmar subsidiary, will produce a diversified line of packaging materials.

COMPANY NOTES

Plastic Innovations, Inc., has moved its offices and factory to new and enlarged quarters at 185 Riverdale Ave., Yonkers, N.Y.

General Electric Co. has named **Frank J. Alberti** as supervisor, subcontracting molded parts for the chemical division's plastics department, with headquarters in Pittsfield, Mass. **Robert H. Krieble** has been appointed as engineer in charge of the Thomson Laboratory at the Lynn, Mass., River Works. **Lawrence C. Felder** has been named sales manager of Textolite surfacing materials.

Tennessee Eastman Co. and **A. M. Tenney Associates, Inc.**, announce the location of their New York offices at 260 Madison Ave. Tennessee Eastman has also announced the appointment of **S. M. Ryburn** as New England representative for all Eastman industrial chemicals, with offices at 7 Hollis St., Farmingham, Mass. **George J. Taylor** has joined the Eastman industrial sales offices in New York City.

Minneapolis-Honeywell Regulator Co. has named **John A. Robinson** as sales manager of the Eastern and Mid-Atlantic regions for the Industrial Div. Joseph J. Matulis succeeds him as industrial manager for the Midwest region, and **C. G. Behnke** has been promoted to industrial manager of the Chicago branch office. Mr. Robinson succeeds **O. B. Wilson** who was recently named field sales manager.

Shell Chemical Corp. has moved its Newark, N.J., office to 10 Commerce Court. **M. H. Keel** has been appointed manager of a newly formed advertising department.

Continental Can Co. has announced that operations of its Plastics Div., located at Cambridge, Ohio, will be discontinued as of August 15. **Hans A. Eggerss**, president of the company, stated that "the financial loss sustained by the company at the Cambridge plant over the years, plus the prospects of continued loss, do not justify further operations."

Kurz-Kasch, Inc., has moved its Chicago offices to 1827 North Harlem Ave.

U. S. Rubber Co. has announced organizational changes in the development department of the Naugatuck Chemical Div.: **Dr. Vadim C. Nekludin**, assistant manager of process development; **Robert M. Greene**, group leader of Paracril and synthetic latex development in the process development section; **Robert L. Knapp**, group leader of Vibrin and Kralac; **Dr. William F. Brucksch, Jr.**, senior group leader for physical chemical research; **E. Leonard Borg**, senior group leader for applied and developmental research in synthetic rubber; and **John A. Flickinger**, group leader for dispersions and Sealz development.

Tinnerman Products, Inc., announces the election of George J. Schad, treasurer, and Robert C. Overstreet, secretary, as vice presidents of the company.

National Association of Corrosion Engineers has moved its central office to larger quarters at 1061 M. & M. Bldg., 1 Main St., Houston, Texas.

The Standard Machinery Co., Mystic, Conn., announces the addition of **Nathaniel Little** and **Earl King** to the engineering staff.

Gustin-Bacon Mfg. Co., producer of Ultralite glass fiber insulation, has extended the distributing territory of Western Fiberglas Supply Co., of San Francisco, previously limited to that city and Los Angeles, to include the entire Pacific Coast and Alaska.

Progressive Machine Co., Inc., 198 E. 25th, Paterson, N. J., specialists in plastics film handling equipment, and **Advance Solvents & Chemical Corp.**, have appointed **Barrett & Breen Co.**, 50 Congress St., Boston, Mass., as their New England sales representatives. Barrett & Breen is a sales organization set up a few months ago to specialize in equipment and materials for the plastics industry. **Mr. Barrett** was formerly with William Whitman Co., Inc. **Mr. Breen** formerly represented B. F. Goodrich Chemical Co. in the New England area.

The Standard Products Co. has promoted **John C. Scott, Jr.**, and **George H. Page** to account executive positions in the Detroit sales office. **James M. Henry** succeeds Mr. Scott as general manager of the company's Gaylord, Mich., division.

The DoAll Research Laboratory has moved into new and enlarged quarters at 254 N. Laurel Ave., Des Plaines, Ill.

Industrial Ovens, Inc., has named Merle F. Schreurs as manager of the new coating research and development laboratory and **John F. Allen**

What do golf balls and tees have in common with Barrett* Plasticizers?

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ELASTEX 10-P Plasticizer—(DIOP)*
"ELASTEX" 28-P Plasticizer—(DOP)
"ELASTEX" 50-B Plasticizer*
"ELASTEX" DCHP Plasticizer
DIBUTYL PHTHALATE

Barrett®

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

In Canada: The Barrett Co., Ltd., 5551 St. Hubert St., Montreal, Quebec

*Reg. U. S. Pat. Off.

PLASTISCOPE

as manager of the Allen Extrusion Machinery Division.

Peerless Printing Ink Co. has announced the appointment of **William F. Polfus** as research director of its technical laboratories and **James H. Gamberton** as plant engineer.

Monsanto Chemical Co. has announced the appointment of **Goss Coated Fabrics Corp.** of Los Angeles as West Coast distributor of Ultron vinyl film.

The company also announced that **Ralph F. Hansen** has been appointed manager of a newly created marketing department in the Plastics Division. Mr. Hansen, who joined the firm in 1945, was assistant sales manager in charge of vinyl film sales.

Narmco, Inc., 930 W. Grape St., San Diego, Calif, has announced a corporate reorganization wherein various branches of its business will now be carried on by new controlled corporations set up by Narmco. The resins and coatings division will be conducted by **Narmco Resins & Coatings Co.** Aircraft activities will be conducted by **Narmco Mfg. Co.** Fishing rods will be manufactured and assembled by **Narmco Sporting Goods Co.** and will be distributed by **National Rod Co.** There has been no change in personnel or general method of operations, the company announced.

Donaco Plastics Corp., in a general reorganizational move, announces the removal of its offices and plant to 5947 W. Fullerton Ave., Chicago, Ill., and the appointment of **Donald Brooks** as president of the corporation. Mr. Brooks succeeds J. E. Donaldson who has resigned. New representatives are now being named to cover various territories.

Bolta-Carpart, Inc., has recently been established by **Bolta Co.,** Lawrence, Mass., and **Carpart Corp.,** Owosso, Mich., to process and manufacture plastics and plastic products. Some of the items scheduled for production at the new company's plant, to be located in Owosso, are automotive hardware, refrigerator trim and functional parts, radio and television cabinets and parts.

Personnel of the new company includes: **John Bolten, Jr.,** president; **Hugh Hartley,** executive vice president; **Thomas S. Drabek,** vice president and sales manager.

Chicago Molded Products Corp., 1020 No. Kolmar Ave., Chicago, Ill., has elected **J. E. Johnston** as vice president and sales manager and **E. F. Bachner, Jr.,** as vice president and director of research.

The Dow Chemical Co. has made the following personnel changes: **Dr. R. H. Boundy,** manager of the plastics department since 1945, has been made Director of Research; **C. B. Branch,** presently manager of technical service and development will replace Boundy; **Eric P. Tuennermann** is production superintendent of the new Styron plant at Allyn's Point, Conn.; **August H. Baum** joins the merchandising section of the plastics sales department; **D. W. McCuaig** joins the molding powders section in Midland; and **Leo J. Bub** has been added to the St. Louis office to handle sale of plastics molding powders in that area.

Goodyear Tire & Rubber Co., Inc., has announced personnel changes. **Allen E. Polson** was appointed to the newly created position of manager of sales service in the chemical division. **Philip S. Sherman** has been assigned to expedite customer service in processing and shipping orders. **Robert E. Workman** has been named to the newly established post of manager of commercial development, with headquarters in Akron.

Libbey-Owens-Ford Glass Co., has announced that Plaskon Div. will come under the direct executive supervision of John D. Biggers, president of the company, as a result of the recent retirement of **D. H. Goodwillie,** former executive vice president who had directed Plaskon activities. **Robert O. Bradley** has been named industrial engineer for the new Fiber Glass Div. factory. **Harry M. Dean** has been transferred to the glass technology section in the research department to work on fiber glass projects. **Robert T. Wallace,** superintendent of the coating resin and alkyd molding compound plants of the Plaskon Div., has been awarded one of the Sloan fellowships for executive development at MIT.

Emery Industries, Inc., announces that **A. R. McDermott** has assumed responsibility for all sales in Texas, Louisiana, Oklahoma, and Arkansas; **N. F. Reinert** was assigned to the Chicago office; and **F. L. Ekstrand** goes to the Philadelphia office. **Dr. Charles G. Goebel** heads the Chemical Research Dept., succeeding **J. D. Fitzpatrick,** who received the first fellowship of the newly established Emery Research Fellowship in the Graduate School of Applied Science of the University of Cincinnati.

Zeco Plastics, Inc., has been formed for the "creation, processing, manufacture and distribution of plastic, wood, and metal articles of all kinds" **by Joseph A. Zwaska,** 2827 Chamberlain Ave., Madison, Wis.

PERSONAL

Howard S. Bunn has been appointed president of **Bakelite Co., a Division of Union Carbide and Carbon Corp.** He has been vice president of Bakelite and Carbide and Carbon Chemicals Co., both divisions of Union Carbide.

Mr. Bunn entered the Carbide organization in 1922. After serving as a salesman and an advertising manager of Carbide and Carbon Chemicals Co., he became manager of the Pyrofax Div. of that company. In 1938 he was appointed manager of the Plastics Div. of Carbide and Carbon Chemicals. In 1944 he became vice president of the Plastics Div. of Carbide and Carbon Chemicals Co. and vice president in charge of sales, Thermoplastics Div. of Bakelite.

Mr. Bunn was born in Philadelphia in 1899. He is a graduate of Lehigh University.

Almost immediately following Mr. Bunn's appointment, he announced that the Bakelite Div.'s sales activities formerly carried on by two separate groups known as the Thermoplastics Dept. and the Thermosetting Dept. would be consolidated, with George C. Miller

Plastics add sales appeal

modern, eye-catching, protective—packaging that sells, made of STYRON 475

Sales of these home drills by ones and twos were good, but as the tool manufacturer expanded his production facilities, he encountered a new problem: how to sell these tools in multiple units, increase over-all sales and gain a wider share of the market. The manufacturer turned to a molder experienced in packaging and to the experts of Dow's Plastics Technical Service. The result was an attractive, durable case made of Styron 475 (Dow polystyrene) that had eye appeal and "buy appeal." This modern package contains 13 different-size drills, each protected from damage in its individual slot. This "working together"—the pooling of your own designers' talents, the molder's and Dow's—may help you improve *your* packaging and get a larger share of the market for your products. And shock- and moisture-resistant, lightweight but tough Styron 475 may be the material that will make your product *stand out* at the sales counter.

let's work it out together!

write today!

did you KNOW

Three thousand years ago the inventive Egyptians isolated a resin from a species of balsam. This material was remarkably similar to today's styrene. It was used for embalming.

Twentieth Century research produced man-made styrene, a versatile chemical. Giving us synthetic rubber in our hour of need, it was made commercially possible through the plastics industry's search for better products. Chemistry transformed it into sparkling crystals of raw material for molding called "polystyrene." How well polystyrene has been tailored to the needs of today is demonstrated by its remarkable growth:

1938 . . . . . 190,000 lbs.
1948 . . . 150,000,000 lbs.
1951 . . . 250,000,000 lbs.

In thirteen years, a production increase of 130,000%! That's right—*one hundred and thirty thousand per cent.*

And the rate of application is doubling every four years! By 1955 this means a thousand pounds of polystyrene molded every minute of every day, all year long. Consider, too, that a pound of polystyrene will make a piece 7½ times larger than a pound of steel produces. Or seven and one-half times as many parts of the same size. What wonders we could show the Pharoahs!

DOW

THE DOW CHEMICAL COMPANY • *Plastics Department PL 404C* • **Midland, Michigan**

New York • Boston • Philadelphia • Atlanta • Cleveland • Detroit • Chicago • St. Louis • Houston • San Francisco
Los Angeles • Seattle • Dow Chemical of Canada, Limited, Toronto, Canada

PLASTISCOPE

named as vice president in charge of sales and Clinton W. Blount named as vice president and general sales manager. Mr. Miller and Mr. Blount were previously vice presidents and general sales managers, respectively, of the former Thermoplastics and Thermosetting Departments. Mr. Bunn stated that the consolidation of Bakelite's sales was desirable because of increasing volume of business combined with the development of new products, greater variety of end uses, and the addition of many new customers.

Previous to this announcement, **Bakelite Co.** had appointed **Arnold F. Sward** as manager of the newly created Consumer Products Department. He will be responsible for the operations of the Consumer Film & Sheeting Div. and the Calendering Materials Div. The company also announced that **J. R. Price**, who was named merchandise manager, Consumer Products, is succeeded as manager of Consumer Film & Sheeting Div. by **J. B. Knowles. C. D. Schuman** succeeds Mr. Sward as manager of the Calendering Materials Division.

Russell E. Poster has been named as abrasive sales engineer for **Clover Mfg. Co.**, Norwalk, Conn.

Prescott Huidekoper, formerly with Plaskon, has joined **Shaw Insulator Co.**, Irvington 11, N.J., as sales representative for New England.

Fred M. Gore, industrial designer, has moved to new and enlarged quarters at 2902 Routh St., Dallas, Texas.

Herman W. Zabel has been appointed executive vice president of **Roger Williams, Inc.**, 148 E. 38 St., New York, N.Y., engineering and economic consultant to the chemical process industries. He was formerly with Chemical Enterprises, Inc., and *Chemical Week*.

William L. Wearly has been elected general sales vice president in charge of all domestic sales for **Joy Mfg. Co.**, Henry W. Oliver Bldg., Pittsburgh 22, Pa.

Morse G. Dial has been elected president of **Union Carbide and Carbon Corp.**, succeeding **Fred H. Haggerson** who continues as chairman of the board. Mr. Dial, who joined the corporation in 1929, was elected executive vice president of Union Carbide in 1951.

Max H. Marin, 189 W. Madison St., Chicago 2, Ill., has been appointed Chicago area distributor for **Mid-America Plastics, Inc.**, and **Moslo Machinery Co.**, both of 2443 Prospect Ave., Cleveland 15, Ohio.

Charles D. Snead has taken over as manager of **Eastman Kodak Co.'s** cellulose products sales division with headquarters in Rochester, N.Y.

William Austin, Jr., has been appointed New York district manager for **Continental-Diamond Fibre Co.**, Newark, Del.

T. F. Muckenfuss has joined **J. B. Products Corp.**, 1745 N. Ashland Ave., Chicago 22, Ill., as general manager.

Harry W. Dudley has been promoted to Eastern District sales manager of **Pittsburgh Coke & Chemical Co.**, with headquarters in the company's New York office.

George P. Archer, formerly with General Electric Co., has been appointed sales representative for New York State by **Rogers Corp.**, Manchester, Conn. His office is at 28 Pomeroy Ave., Pittsfield, Mass.

William Turner Stopford has been elected vice president of **Boonton Molding Co.**, Boonton, N.J. Mr. Stopford, who joined the firm in 1943, has been in charge of Boontonware sales.

Bradford S. Smith has been appointed regional sales representative for **The Federal Leather Co.**, Belleville, N.J. He will cover the Mid-West.

K. R. Troyer has been appointed vice president of **Columbia Machinery & Engineering Corp.**, Hamilton, Ohio.

C. W. Krause heads **Shawnee Plastics, Inc.**, a new organization specializing in molding, painting, and plating thermoplastic parts, located at 1801 W. Iowa St., Evansville, Ind.

George B. House has resigned as executive vice president of Elmer P. Scott Co., Inc., 47 E. 34 St., New York, N.Y.

E. Kirby Preston has been appointed to the sales staff of **Celluplastic Corp.**, Avenue L, Newark, N.J.

C. M. Norris has been appointed general manager, and reelected vice president, of **American Insulator Corp.**, New Freedom, Pa.

Deceased

Carl N. Beetle, president of the Carl N. Beetle Plastics Corp., Fall River, Mass., died suddenly May 20. Mr. Beetle was a well known naval architect and yacht builder, and designer and builder of the famous line of Beetle boats.

MEETINGS

June 23-27—American Society for Testing Materials, 50th Anniversary and Annual Meeting, Hotels Statler and New Yorker, New York, N.Y.

July 14-18—Western Summer Market, Western Merchandise Mart, San Francisco, Calif.

Sept. 9-13—American Chemical Society, Seventh National Chemical Exposition, Chicago Coliseum, Chicago, Ill.

Sept. 11-13—American Institute of Chemical Engineers, Palmer House, Chicago, Ill.

Sept. 11-14—Packaging Machinery Manufacturers Institute, 20th Annual Meeting, Homestead, Hot Springs, Va.

Oct. 29-31—American Society of Body Engineers, Seventh Annual Technical Convention, Rackham Memorial Bldg., Detroit, Mich.

Dec. 7-10—American Institute of Chemical Engineers, Annual Meeting, Hotels Cleveland (headquarters) and Carter, Cleveland, Ohio.

S.P.E. Meetings

Sept. 19—Mr. F. W. Reynolds, International Business Machines Corp., will address the Buffalo Section on "Plastics, A Case History."

Oct. 17—Mr. Paul Elliott, Naugatuck Chemical Div., will speak to the Buffalo Section on "High Impact Styrenes and Copolymers."

Crystal ball—1952 style

You probably recognize our crystal ball as the marble from which are drawn miles and miles of fine, flexible, glass fibers.

In your work with plastics you know what a terrific job these fibers are doing as reinforcing filaments . . . in sheets and shapes . . . for a thousand different uses.

What you may not know is that Ferro is making glass fibers. In the glass business for more than 30 years, manufacturing glass for use as porcelain or vitreous enamel, Ferro brings a lot of know-how to this new phase of its business . . . acquired through operation of 13 plants throughout the world, currently producing more than 300 different glass compositions.

This background, together with our experience in producing *colors and stabilizers for plastics,* can help solve your problems when it comes to glass . . . or glass fibers, to reinforce your plastic products.

Let our crystal ball help chart your reinforced plastics future. Let our specialized knowledge of both glass and plastics be your stepping stone to wider and more profitable horizons. Write today!

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Fiber Glass Division

200 Woodycrest Ave., Nashville, Tenn.

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MACHINERY and EQUIPMENT FOR SALE

FOR SALE: Quick delivery Rubber and Plastic Equipment. Farrel 16" x 48", and 15" x 36", 2 roll rubber mills. New 6" x 12" and 6" x 16" Lab. Mixing Mills and Calenders. Other sizes up to 84". Royle #½, #1, #2 and #3 extruders, also other sizes. 200 ton Brunswick 21" x 21" Platens, 14" Ram, Record Presses. Francis 175 ton 24" x 18", W.S. 100 ton 24" x 24". Elmes 75 ton 30" x 36". Also presses Lab. to 1500 tons from 12" x 12" to 48" x 48". Hydr. Oil Pumps. Gould 75 HP motor Dr. 2 stage Centrif. Pump 250# WP. W.S. 4 Plgr. High and low Pressure Hydr. Pump. HPM 5 GPM 2700 lbs. Elmes Hor. 4 Plgr. 4500 lbs. and 5500 lbs. Hydr. Accumulators. Closed Steel ASME Pressure Tank 275 PSI, 1200 gals. Stokes Automatic Molding Presses. Rotary & Single punch Preform Tablet Machines ½" to 3". Injection Molding Machines 1 oz. to 32 oz. Baker Perkins jacketed mixers 100, 50, 9 and 4½ gals. Ball & Jewell & Leominster Plastic Grinders. Heavy duty mixers, grinders, pulverizers, gas boilers, etc. Partial listing. We buy your surplus machinery. Stein Equipment Co., 90 West Street, New York 6, N.Y. WOrth 2-5745.

FOR SALE: 50 Ton Stokes Presses & Pump. 200 Ton W.S. Hobbing PRESS, 300 Ton W.S. PRESS 24 x 20 Platen, 175 Ton H.P.M. PRESS 30 x 30 Platen, 150 Ton Farrel PRESS 30 x 30 Elec. Plates. 140 Ton W.S. PRESS 23 x 17 Platens, 85 Ton Stewart Bolling PRESS 20 x 20 Platen, 50 Ton Elmes PRESS with 18 x 18 Elec. Platen, 75 Ton W.S. PRESS 15 x 15 Platen, 75 Ton Adamson PRESS 20 x 20 Platens. Laboratory presses. Accumulators, Piston and Oil Pumps. AARON MACHINERY CO., INC. 45 Crosby St., N.Y.C.

FOR SALE: 1—22" x 60" 2 Roll Compounding Mill, 150 HP synchronous motor; 1—16" x 42" mill with 75 HP motor; 1—2" oil heated plastics Extruder, motor driven; 1—Stokes R Preform Machine, motor driven. Also Grinders, Extruders, Compression and Injection Molding Presses, Mixers, etc. Send us your inquiries. Consolidated Products Co., 13-14 Park Row, New York 38, N.Y.

We handle hydraulic presses, pumps, and power units of all sizes. Write us your requirements and we will try to help you. We find it impossible to list our equipment in this classified column due to the fact that the equipment is sold before ad is published. For those who seek action look in the New York Times under the Machinery and Tool Column for our regular Sunday Special. Hydraulic Sal-Press, Inc., 386-90 Warren Street, Brooklyn 2, N.Y. MAin 4-7847

FOR SALE: Thermex Preheater, Model 2P; Airtronics Preheater, Model D E; Airtronics Preheater, Model C B. Like new. AARON MACHINERY CO., INC. WOrth 4-8233, 45 Crosby St., New York 12, N. Y.

FOR SALE: Complete wood flour mill. Capacity 10 tons per 24 hours, using nearby supply of pine and poplar. For further particulars address Box 1560, Modern Plastics.

FOR SALE: 2 15-ton Stokes 200D3 presses new in 1946 and 1951. One with unscrewing device. Reply Box 1559, Modern Plastics.

FOR SALE: Cumberland "O" 2 HP plastics scrap grinder; H.P.M. Pump reconditioned like new, capacity 11 gallons per minute; Brand new complete nylon attachment set-up for 2½L 8 oz. Lester Press; 8 oz. injection end for 2½L Lester Press complete including cylinder. Reply Box 1567, Modern Plastics.

SAVE WITH GUARANTEED REBUILT EQUIPMENT—RUBBER MIXING MILL, heavy duty 18"x48"; HYDRAULIC PRESSES: 28" x 25" 18" ram, 400 tons; 36" x 36" 16" ram, multiple opening, 250 tons; 37" x 37" 30" ram, multiple opening 1060 tons; 20" x 20" 10" ram, 200 tons; 22" x 15" 8" ram, 75 tons; 14" x 14" 8" ram, 75 tons; 12" x 12" 8" ram, 75 tons; 19" x 24" 10" ram, 75 tons; 18" x 16" 7½" ram, 60 tons; 12" x 12" 7½" ram, 60 tons; 14" x 14" 8" ram, 50 tons; 12" x 12" 6½" ram, 50 tons; 8" x 9½" 4½" ram, 20 tons; 16" x 16" 3½" ram, 12 tons; LABORATORY PRESSES: 10 ton 6" x 6" Carver, 20 ton 8" x 8" Carver; NEW UNIVERSAL DUAL PUMPING UNITS: 3 to 15 HP; NEW LABORATORY MILLS & CALENDERS; EXTRUDER: Royle #1 Plastic, insulating type; ACCUMULATOR: HPM 6" ram 2500#; Preform Presses all sizes, also Mixers, Vulcanizers, Injection Molding Machines, etc. Universal Hydraulic Machinery Co. Inc., 285 Hudson Street, New York City 13, N.Y.

FOR SALE: One 24-oz. Watson-Stillman Injection Molding Machine. Can be inspected in operation. Also, extra 18-oz. and 24-oz. cylinders, rams, and bushings. Write Box 1572, Modern Plastics.

FOR SALE: NEW CHROMALOX STRIP HEATERS: 250, 300, 500 & 750 WATT UNITS—In original export packing. Write for specifications. J. F. JOYCE, 1820 Callowhill St., Phila. 30, Pa.

FOR SALE: Rotary Vacuum Filter 54" wide 12' 6" in circumference with 3 H.P. Motor, Goodrich Planatary Speed Selector, Nash Hytor Rotary Vacuum Pump, Vacuum Tank and Winfield Smith Reducer. 500 gallon Jacketed Steel Kettle. 4—Steel Tanks 9' 6" O.D. by 12' deep. 3—Patterson Agitator Units 10 H.P. Motor. 5—Ingersoll Rand Motor Driven Pump 150 G.P.M. Williams #2 Shredder. Quaker City Hammer Mill with motor. Address Box 1573, Modern Plastics.

FOR SALE: 2 Kux Rotary Pellet Presses Model 25, 21 punch and 25 punch. 6 Stokes Rotary Pellet Presses 16 punch, Models B-2, D-3 and D-4. Read Co. 600 gal. Jacketed Ribbon Mixer. Large stock Stainless Steel Tanks from 6 gal. to 5700 gal. PERRY EQUIPMENT CORP., 1429 N. 6th St., Phila. 22, Pa.

FOR SALE: 3 Model 126-S Johnson Bottle Cap Liner Machines Several Holub-Dusha, Type 45 Button Inspection Machines. Useful for small parts inspection where parts have to be turned over for inspection on both sides. Boonton Molding Co., 326 Myrtle Avenue, Boonton, N. J.

FOR SALE: Used equipment in first class condition. 200 Ton self-contained Hydraulic molding press, Stoke Standard No. 250 complete with direct motor driven duplex pump and automatic time cycle control. Head has 2" bushed hole and flat top surface for possible conversion to plunger molding. With 2 H.P. gas fired boiler. Mears Kane Ofeldt Type LAX Max. W.P. 150 Rotary Preform Press. F. J. Stokes model DS-3C with variable speed pulley drive, 3 H.P. AC 220 volt, 3 phase, 60 cycle motor complete with one set of 15 standard 1 3/16" dia. round flat face punches and dies. Capacity 275 preforms per minute. Rodale Mfg. Co., Inc., Emmaus, Pa.

FOR SALE: One 200 ton self-contained semi-automatic Molding Press. One 32" x 10" x 48" —16 gallon—2030 psi—Watson-Stillman Hydro Pneumatic Accumulator. Three Oil Gear high pressure hydraulic Pumps—type C-3517. Two HYCON "Hylo" series Hydraulic Pumps—1½ gpm at 3000 psi—10 gpm at 500 psi. Plastic Machinery Exchange, 426 Essex Avenue, Boonton, N. J.

FOR SALE: 6 oz. Lester Injection Press with 3 Wheelco Heating Controls in excellent condition can be seen running. Bought new in 1947, located in Northern New Jersey—Replacing with two 2-oz. machines due to present sales policy. Reply Box 1584, Modern Plastics.

FOR SALE: Injection Presses—8 & 24 oz. Watson; 9, 12, 40 oz. HPM; 8 oz. Lester; 12 oz. DeMattia; 22 oz. Impco; 3 oz. vert. Munton; 1 oz. Van Dorn. Extruder—3¼" ext. Royle, oil heat. Conveyors 40', Cooling trough 10'. 4 Scrap grinders. Ovens. 150 & 250 T. Transfer presses. 250 T. Laminating press. Preform presses. Sheridan embossing press. 42" Johnstone slitting machine. 7½ HP Reliance Varidrive. List your surplus equipment with me. JUSTIN ZENNER, 823 W. Waveland Ave., Chicago 13, Illinois.

FOR SALE: Sacrifice new heat sealing automatic bag machine. Simplex Model 4-7 makes bags up to 12" wide and up to 20" long from tubing or flat stock, flat or gussett bags. Machine is five months old and has been run less than ten hours. Sacrifice to best offer. Reply Box 1591, Modern Plastics.

FOR SALE: At tremendous Savings—Colton 2 and 3 RP Rotary Tablet Machines. Mikro 1SH, 3TH, 4TH Pulverizers; Jay Bee and Schuts O'Neill Mills. Baker Perkins & Readco Heavy Duty Steam Jacketed, Double Arm 50, 100, 150 gal. Mixers. Baker Perkins 150 gal. D. A. Unidor Jacketed Mixer. Baker Perkins 100 gal. D. A. Vacuum Mixers. J. H. Day from 8 up to 75 gal. Imperial and Cincinnatus D. A. Jacketed Sigma Blade Mixers. Hobart & Read Vertical Mixers from 15 to 120 quart, with removable bowls. Day & Robinson 100 up to 4000 lbs. Dry Powder Mixers. Pony ML and M Labelrites. Package Machy. FA, FA4 Miller, Hayssen 3-7, Scandia, Campbell Auto. Wrappers. REBUILT AND GUARANTEED. This is only a partial list. Over 5000 machines in stock—available for immediate delivery. Tell us your machinery requirements. UNION STANDARD EQUIPMENT CO., 318-322 Lafayette Street, New York 12, N. Y.

FOR SALE: Boiler, 200 lb. 15 H.P. Eclipse gas fired. Fully automatic. In operation. Reply Box 1594, Modern Plastics.

FOR SALE: Two Lester Injection Molding Machines, fully automatic, type LPM, 6 oz. capacity, 6 oz. piston, die space 14", min. 6", die opening 7", die plates 21" x 23", stroke 8½", capacity hopper 25 lbs, pressure 16000 psi, 15 HP AC motor, 1938 machines. Price $3500.00 each. AMCO MACHINERY COMPANY, 125 Leib Street, Detroit 7, Michigan.

MACHINERY and EQUIPMENT WANTED

WANTED: To Expedite Production—Rubber Making Machinery including Banbury Mixers, Heavy Duty mixers, Calenders, Rubber Rolls & Mixers, Extruders, Grinders & Cutters, Hydraulic Equipment, Rotary and Vacuum Shelf Dryers, Injection Molding Machines. Will consider a set up plant now operating or shut down. When offering give full particulars. P.O. Box 1351, Church Street Sta., New York 8, N. Y.

WANTED: REED PRENTICE 8-oz. or 12-oz. or HPM 9-oz. Must be post-war models. Send full particulars to Box 1558, Modern Plastics.

WANTED: New or used 2½" or 3¼" N.R.M. extruders. Also parts such as cylinders, etc. Reply Box 1565, Modern Plastics.

(*Continued on page* 208)

PLASTICS INJECTION MOULDING MACHINES. 1 & 2 OZ.

These hydraulic semi-automatic machines are extremely powerful and have a high rate of production. They are specially designed for unskilled female labour. Operated by one lever only and the patent toggle action renders these machines perfectly safe and extremely light to operate. Both machines are fully self-contained including water cooling for the tank and both halves of the moulds. Heat thermostatically controlled to plus or minus ½°.

SHOT CAPACITY	1 OUNCE	2 ONCE
Moulding Area	12 sq. ins.	22 sq. ins.
Plasticizing Capacity per Hour	9 lbs.	18 lbs.
Injection Pressure	5⅓ tons	11 tons
Mould Locking Pressure	22 tons	44 tons
Mould Opening	4½"	7"

	1 OUNCE	2 OUNCE
Heating Unit Consumption	1000 Watts	2000 Watts
Motor, Electric	3 H.P.	6 H.P.
Hydraulic Pump	Vickers V.105-A	Pesco 3H58CX
Size of Base	4'8" x 1'10"	5'8" x 1'10"
Shipping Weight	18 cwt.	27 cwt.

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Graduate Engineer with two to four years' experience with acrylics, glass fiber laminates, honeycomb sandwich and thermoplastic materials. To assist in design application, processing problems and development work.

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CLASSIFIED ADVERTISING

(*Continued from page 206*)

WANTED: 1 Defiance #20 Preform Press. Boonton Molding Co., 326 Myrtle Avenue, Boonton, N. J.

WANTED: Injection Molding Presses, 12 oz. to 24 oz. for large plant expansion. State full description of machinery and asking price and whether or not machine can be seen while operating. Southern Plastic Industries, Inc., 508 Stewart Ave., S. W. Atlanta, Ga.

WANTED: Midwest molder needs injection molding machine of 8, 9, 10, or 12 ounce capacity. Must be late model in good condition. Send full particulars including price to Box 1585, Modern Plastics.

WANTED: Bambury Mixer—Type 3A. State particulars, price and location. Reply Box 1597, Modern Plastics.

WANTED: Thermoplastic extruder 2½" x 4½". Scrap grinder, Conveyor, Dies, other auxiliary equipment. Will also consider buying or leasing set up plant in Metropolitan N. Y. or N. J. Reply Box 1598, Modern Plastics.

MATERIALS FOR SALE

FOR SALE: REPROCESSED POLYETHYLENE—We generate 20,000 pounds of uncontaminated polyethylene pellets monthly in our manufacturing process. We are seeking a continuing outlet for this material. Users of reworked polyethylene can save by dealing directly with us. Address Box 1568, Modern Plastics.

FOR SALE: 3000 pounds Flesh and Pink Butyrate Molding Powder, reground 28¢ per pound. Reply Box 1582, Modern Plastics.

FOR SALE: Reground natural Polyethylene gates and sprues 5000 pounds. Reprocessed natural Polyethylene Pellets 10,000 pounds. All or part thereof for immediate delivery. Reasonable price. Reply Box 1593, Modern Plastics.

MATERIALS WANTED

WANTED: PLASTIC Scrap or Rejects in any form. Acetate Butyrate, Polystyrene, Acrylic, Vinyl Polyethylene, etc. Also wanted surplus lots of phenolic and urea molding materials. Custom grinding, magnetizing and compounding. Reply Box 1555, Modern Plastics.

WANTED: PLASTIC SCRAP or REJECTS in any form: Cellulose Acetate, Butyrate, Polyethylene, Polystyrene, Vinyl, Acrylic Ethyl Cellulose. Reply Box 1556, Modern Plastics.

WANTED: Plastic scrap such as Cellulose Acetate, Vinyls, Acrylic, Ethyl Cellulose, Polystyrene, Butyrate, etc. We also buy surplus inventories of molding powder or grind, clean and reprocess your own scrap. Claude P. Bamberger, Inc., 152 Centre St., Brooklyn 31, N. Y. Tel. Main 5-5553. Not connected with any other firm of similar name.

WANTED: Plastic Scrap, Rigid Vinyl, Cellulose Acetate, Polystyrene, Polyethylene, Butyrate, Custom grinding, magnetizing, compounding, and straining of contaminated plastics. Franklin Jeffrey Corporation, 1671 McDonald Avenue, Brooklyn, N. Y. ES 5-7943.

SURPLUS UREA MOLDING POWDER WANTED. Reply Box 1562, Modern Plastics.

WANTED: NITRATE SCRAP—.010 plastic scrap in any form, sheets or rolls to as narrow as 1¾" wide. Due to storage and fire restrictions would prefer to buy in quantities of ten to fifty pounds. Address B & J SPECIALTIES CO., 1265 Harrison St., Noblesville, Ind.

WANTED: VINYL SCRAP. Must be graded, high quality material in either clear or white. Resin base must be uniform throughout. Highest prices paid for suitable materials in large quantities. Reply Box 1596, Modern Plastics.

MOLDS FOR SALE

FOR SALE: One tooth brush mold and one soap box mold. Each mold makes one complete two-piece container. Price is reasonable. Reply Box 1590, Modern Plastics.

FOR SALE: Several injection molds for light weight fancy combs of good designs available at advantageous prices. Reply Box 1595, Modern Plastics.

MOLDS WANTED

MOLD WANTED for injection molding. We will buy one mold or a complete line or series of molds for finished resalable items. Housewares, toys, novelties, etc. Will also buy molds for industrial parts such as handles, knobs, drawer pulls, gears. All items for resale in U. S. A. Send detailed information to Victory Manufacturing Company, 1722 W. Arcade Place, Chicago 12, Illinois.

WANTED: Compression Molds suitable for 150-ton press. Sale or rental for export. No button molds wanted. Reply Box 1580, Modern Plastics.

BRUSH MOLDS WANTED FOR CASH: Injection molds for ladies', men's, military, nail, tooth, brushes, etc. Send particulars and samples. Box 51, Realservice, 110 West 34th St., N.Y.C.

HELP WANTED

SALESMEN FOR ESTABLISHED CHICAGO INJECTION MOLDER with capacity to 200 oz. Prefer experience in plastics and capable of giving some engineering service to customer. Will consider men controlling one account or deal. Men required in all industrial areas plus man for Chicago office. Applicant assured excellent cooperation of plant equipped for volume molding, assembly, painting, etc. Give complete details to Box 1557, Modern Plastics.

DEVELOPMENT ENGINEER: Familiar with the formulation and application of resinous material for surface coating. Experience in the application of such materials to continuous webs highly desirable. Submit complete resume, along with recent snapshot and salary requirements. Good starting salary, many desirable employee benefits. Reply Box 1561, Modern Plastics.

CHEMIST: Adhesive experience. Must have several years starch dextrin, animal glue, polyvinyl resins, latex, or hot melt formulation. Excellent opportunity for advancement with young fast growing concern. Salary open. Reply by mail—strictly confidential. Reply Box 1571, Modern Plastics.

WANTED: VINYL COATING ENGINEER —Experienced in organisols and plastisols. Furnish details of experience first letter. Reply Box 1564, Modern Plastics.

WANTED: SALES MANAGER, PLASTICS MOLDING. Midwest molder, well rated, and well established in custom and proprietary molding, has opening for aggressive sales manager. Must have knowledge of plastics and their markets together with imagination and ability to promote further sound growth in this field. Salary. Reply Box 1569, Modern Plastics.

EXTRUSION ENGINEER MANAGER: Complete knowledge and technical experience to run shapes, tubes, rods in thermoplastic materials. Advise of complete history in first letter. Salary open. All major benefits. Just completed new modern extrusion plant. Superior Plastics, Inc., 426 N. Oakley Blvd., Chicago 22, Illinois. Harry Scheer President. Replies strictly confidential.

WANTED: Injection Molding Foreman; experienced set-up man for Van Dorn Machine. State experience and salary desired. Reply Box 1570, Modern Plastics.

SALES ENGINEER (PLASTICS): EXPERIENCED IN ACRYLIC FABRICATION—The man we are looking for must be alert, ambitious, of high calibre & interested in furthering his career through association with a well known firm in a fast growing, expanding industry. Substantial draw against comm. For further information or interview write or call STEINER PLASTICS, Pratt Oval, Glen Cove, Long Island, N.Y. Glen Cove 4-6400.

SALES REPRESENTATIVE wanted—PHENOLIC RESINS. Willing to make commission arrangement if so desired. Our men have been advised about this advertisement. Reply Box 1563, Modern Plastics.

SALES ENGINEER: Opening for Sales Engineer in Chicago territory for one of the largest established Midwest Injection Molders with machine capacity up to 300 ounces. Territory fully established. Salary bonus and other fringe benefits. Age 27 years or over. Will require experience in selling and servicing industrial type accounts. Experience in plastic or some allied line such as, die casting, hard rubber, etc., necessary. Write full resume of qualifications to Amos Molded Plastics, Edinburg, Indiana. Attention: J. C. K.

SALESMAN: Excellent opportunity for young experienced molding compound Salesman with well-established, nationally known midwestern plastics manufacturer. Submit complete resume and salary requirements. Reply Box 1576, Modern Plastics.

MOLDER'S SALES REPRESENTATIVE: Strong, established custom molder in Chicago area, requires services of experienced, full time salesman for Midwest territory. Must know compression and injection molding. Write, giving full details to Box 1577, Modern Plastics.

NYLON MOLDING: Man to take charge of nylon molding department. Experience required in diversified production injection molding nylon parts. Location Eastern Pennsylvania. Excellent opportunity with established and growing concern. Send detailed outline of experience, qualifications, and salary requirements to Box 1578, Modern Plastics.

SALESMAN WANTED CHICAGO AREA: Well known Eastern plastic scrap firm has opening for experienced buyer-salesman. Good opportunity for man who can qualify. Please mail complete resume and salary requirements. All replies will be kept in confidence. Reply Box 1579, Modern Plastics.

EXECUTIVE POSITION OFFERED with large concern opening a Plastics Division to handle Scrap Plastics. We are looking for a man experienced in all types of plastics to promote and manage this Division with a share in profits. This Division can be developed rapidly and profitably because of location. Apply Erie Iron & Supply Corporation, P.O. Box 707, Erie, Pa.

SALESMAN—CUSTOM MOLDED PLASTICS—Progressive Injection Molder in Metropolitan Area desires live-wire man with experience in calling on industrial concerns. Would be willing to train someone with proper background. Have own engineering, toolroom, molding and assembling facilities. Salary and commission basis. Submit complete resume stating experience, etc. Confidential. Our staff knows about this advertisement. Reply Box 1592, Modern Plastics.

SALES REPRESENTATIVE WANTED: Rapidly expanding extrusion firm desires representation in areas outside of New York. Please send resume of background, etc. Reply Box 1587, Modern Plastics.

(*Continued on page 210*)

You name the TEMPERATURE

. . . we'll supply the right PX PLASTICIZER

From protective coverings in the Arctic to beach mattresses in the Tropics, today's vinyl plastic products must meet new and rugged temperature conditions. The broad line of Pittsburgh PX Plasticizers will provide you with the specific plasticizer, or the combination of plasticizers, you need to insure optimum *stability* and *flexibility* in vinyl products under practically any temperature extreme.

And remember this: as a basic producer, we're also able to offer you the assurance of top uniform plasticizer quality from one order to the next . . . fast, efficient shipments . . . and dependable, continuing supplies. What's more, our engineers may be able to show you how to further increase the quality of your product and reduce production costs through better plasticizer selection and use. *Why not call or write us today?*

PX-104	DiButyl Phthalate
PX-108	DilsoOctyl Phthalate
PX-138	DiOctyl Phthalate
PX-208	DilsoOctyl Adipate
PX-238	DiOctyl Adipate
PX-404	DiButyl Sebacate
PX-408	DilsoOctyl Sebacate
PX-438	DiOctyl Sebacate
PX-658	TetraHydroFurfuryl Oleate
PX-917	TriCresyl Phosphate

WBD 4240

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COAL CHEMICALS • AGRICULTURAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

CLASSIFIED ADVERTISING

(*Continued from page 208*)

PLASTIC ENGINEER: Manufacturer in the Kansas City area desires services of a plastic engineer. Must have experience in plastic sheet Post-Forming and Fabrication, and Injection Molding, including operation and maintenance of injection molding presses, and plastic die design. Give full details on background, present salary and salary desired. Box 1586, Modern Plastics.

NEW ENGLAND WIRE MANUFACTURER requires experienced Plastics Engineer to take care of their extruding and molding departments. Reply Box 1599, Modern Plastics.

DEVELOPMENT ENGINEER: Established Massachusetts firm has unusual opportunity for college trained engineer capable of assuming the responsibility for plastic product development. Basic analytical approach to problems, initiative, ingenuity and mechanical aptitude more important than previous plastic experience. Submit complete resume including education and salary required to Box 1601, Modern Plastics.

SITUATIONS WANTED

MAN EXPERIENCED in High Vacuum Coating Machines seeks position in this field. Extensive knowledge in lacquer processing and coating. Familiar with all gauges and jigs concerning the High Vacuum Machine. Reply Box 1600, Modern Plastics.

PLASTICS EXEC, heavy weight, desires change, association with progressive firm. Has expert technical knowledge, national reputation. For last ten years held executive positions with major injection molders and fabricators; charge of production and cost control; sales supervision. Experienced with proprietary lines; housewares; toys and custom work, quotations, mold design. Author of several publications; established first Plastics Engineering course for U. S. Office of Education. Reply Box 1589, Modern Plastics.

MERCHANDISE DESIGNER with heavy diversified experience with largest National Manufacturers. Leading trademarked lines: Sungoggles, Combs, Hairbarrettes, Toothbrushes, Hairbrushes, Box-packing, Toys, Household products, Novelties. All lines with outstanding sales records in domestic and foreign market without advertising support. Practical and engineering education, experience with injection and compression molds, assembly, decoration. Seeks new position. Reply Box 1581, Modern Plastics.

14 years laminating experience can be your asset. PLASTICS ENGINEER with B.S. Chemical Engineering, Technical Director, proven Manager with strong technical and production background, process development, machine design, quality control. Desire MANAGEMENT caliber LAMINATING work. Experience mainly with phenolics and melamines, some polyester. Reply Box 1575, Modern Plastics.

AVAILABLE: PRODUCTION MANAGER or **PLANT SUPERINTENDENT** with considerable practical experience in the calendering of Vinyl Film and Vinyl Sheeting. Reply Box 1566, Modern Plastics.

ENGINEER—PLASTIC CHEMIST: university degree, highly qualified, 14 years experience in production planning, management and coating, specialized in film calendering, coating (leather cloth), embossing and printing seeks a position. Manufacture of organosols, plastisols, polyethylene coating and extruding. Reply Box 1588, Modern Plastics.

SERVICES OFFERED

WANTED FOR EXPORT—Products for the Plastics Industry. Long established export department of well rated plastics manufacturer wants additional items, such as raw materials, semi-finished products, machinery and equipment, for foreign distribution, preferably on an exclusive basis. Efficient handling of correspondence and export technicalities; complete financing. Competent resident representatives in many countries. Reply Box 1602, Modern Plastics.

MISCELLANEOUS

TECHNICAL ADVISORY SERVICES for Manufacturers of Industrial Plastics Components. Established 1945. JAMES L. FITZSIMMONS, Direct Factory Representative, 39 Lackawanna Plaza, Bloomfield, New Jersey.

FOR SALE: Small company producing high impact molding compound—one profitable product sold at capacity—equipment for sheet production in large volume available but not in operation at present—business and machinery can be purchased for less than carryover tax loss. Reply Box 1574, Modern Plastics.

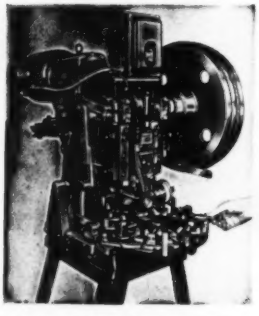
WANTED: Company with stock injection mold for hollow plastic balls, 4" diameter, to supply ball halves in consistently large and increasing quantities. Present mold is worn out and we will need 12,000 to 15,000 pairs of ball halves per month very shortly. Reply Box 1583, Modern Plastics.

All classified advertisements payable in advance of publication

Up to 60 words $10.00	Up to 120 words $20.00	Up to 180 words $30.00
Up to 60 words (boxed) .. $20.00	Up to 120 words (boxed) .. $40.00	Up to 180 words (boxed) .. $60.00

For further information address Classified Advertising Department, Modern Plastics, 575 Madison Avenue, N. Y. 22, N. Y.

HOT STAMP



The Acromark No. 2A Hot Stamping Press can be set for marking speeds to suit either hand or mechanical feeds. The dial feed shown is hand loaded but automatically ejected. Hot stamping speed (in color) is about 58 units per minute. Automatic feed can double production if shape of plastic part lends itself to mechanical feeding.

Write to— The Makers of a Full Line of Marking, Numbering and Hot Stamping Machines.

The ACROMARK Company

5-15 MORRELL ST., ELIZABETH 4, N. J.

Plastics Engineer

● Graduate engineer with approximately five years experience in application or testing of plastic materials, primarily thermoplastic and thermosetting molding materials and laminates, for work in Plastics Laboratory. Should have a good knowledge of physical properties of plastics.

Excellent working and living conditions, good salary, moving expenses paid, exceptional employee benefits.

Write, giving full details, including education and experience, to:

R. H. Austin, Personnel Director, International Business Machines Corporation, Endicott, New York.

form grinding

FAST • ECONOMICAL

Low tool and running cost with accuracy to ±.002 on non-metallic cylindrical turnings makes Form Grinding the answer to many of today's production—capacity problems.

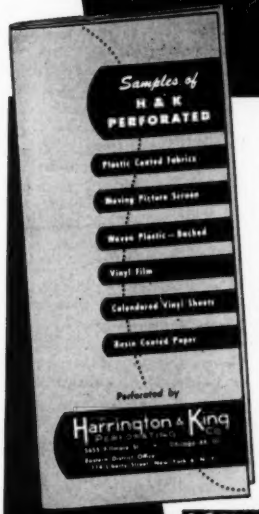
Range of size is from ⅛" to ¾" in diameter up to 7" long.

SEND A PRINT OR SAMPLE OF YOUR PART FOR QUOTATION...

nylon
fiber
acetate
bakelite
cork
wood

ORANGE PRODUCTS, INC., 82 MAIN ST. • WEST ORANGE, N. J.

The PERFORATING of PLASTICS



This folder of perforated swatches includes samples of various forms of plastics available as coated fabrics, vinyl sheet and film, resin coated paper and woven plastic fibers—all perforated with various sizes and spacings of holes.

The perforating provides ventilation and air escape for upholstery, sound escape for moving picture screens, light transmission for advertising signs as well as for decorative and many industrial purposes.

With 68 years of experience we are prepared to meet the requirements of the plastic industry when perforating is required.

Send for this folder of samples —gratis.

The Harrington & King Perforating Co

5680 Fillmore St., Chicago 44, Ill.
114 Liberty St., New York 6, N. Y.

Specifically DESIGNED for LABORATORY SERVICE

This compact, 30-ton, self-contained hydraulic platen press is specifically designed for the exacting service of the laboratory. Accurate, versatile and easy to use, it is one of many types manufactured by R. D. Wood for laboratory service.

The press operates under a maximum working pressure of 2,200 psi, has an 8" ram stroke, a 24" press opening and occupies a floor space of approximately 4' x 4'. The press platens, measuring 12" x 18", may be either steam or electrically heated. The press is equipped with an elevator for raising and lowering molds from the bench to press platens.

Write, without obligation, for information on this and other R. D. Wood hydraulic presses for plastics.

HYDRAULIC PRESSES AND ... FOR EVERY PURPOSE
ACCUMULA... ...ERS

Est. 1803 **R. D. Wood Company**

INDEX OF ADVERTISERS

JULY 1952

(*Continued on page 214*)

How to avoid complications on complicated *molding* jobs . . .

bring them to *Erie*

a pioneer in custom molded plastics

There are six pieces in this simple-looking military flashlight molded for Niagara Searchlight Corporation, Buffalo, N. Y. There are 5 male and 4 female threads. And there's the very intricate design of the "throat."

It's the sort of job that Erie Resistor likes. It requires precision accuracy . . . threads must be clean and sharp . . . assembly must be fast, on the assembly line or the firing line . . . individual parts must be exactly uniform, freely interchangeable. The complexity of the L-shaped tube and "throat" called for a high degree of ingenuity in die design and molding technique.

Erie Resistor has the facilities for any possible custom injection molding job. Twenty-three presses, from 2 ounce to 60 ounce capacity, and complementary up-to-the-minute finishing equipment provide an unusual potential of versatility and economy of production. And facilities are utilized by a personnel of long experience in tackling and solving the tough problems of injection molding.

Plastics Division

ERIE RESISTOR CORP., ERIE, PA.

LONDON, ENGLAND . . . TORONTO, CANADA

Cliffside, N. J. • Philadelphia, Pa. • Buffalo, N. Y. • Chicago, Ill.
Detroit, Mich. • Cincinnati, Ohio • Los Angeles, Calif.

INDEX OF ADVERTISERS

(Continued from page 212)

MODERN PLASTICS

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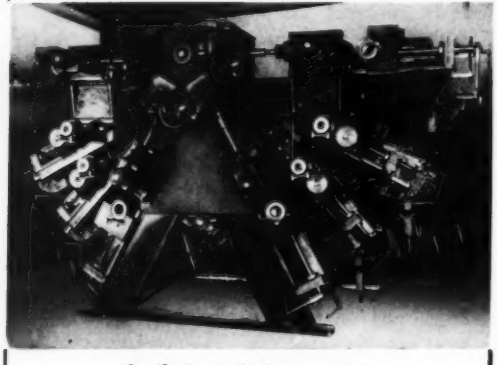
UNIQUE NEW LEMBO

prints four colors by rotogravure; up to eight colors by surface printing

- for vinyl and other plastic films
- readily changed from gravure to surface printing
- new adjustment prevents wrinkling of sieve cloth
- optional handwheel or motor register control
- available to print up to 12 colors and to 80" wide



Specifications and prices on request
Write for our new illustrated brochure
LEMBO MACHINE WORKS, INC.
248 EAST 17TH ST. PATERSON 4, N. J.
Manufacturers of Printing Presses and Cylinders

BELLE OF THE BALL

Would you like your molded polystyrene product to have the best? Appear to advantage in the most select company? You can achieve a finish that spells j-u-s-t r-i-g-h-t with that good Pioneer polystyrene lacquer.

Let us show you our attractive, eye-catching colors . . . or match yours. Send for a working sample.

Lacquers for the Plastics Industry

Pioneer Lacquer Corp. Cherry Valley, Mass.

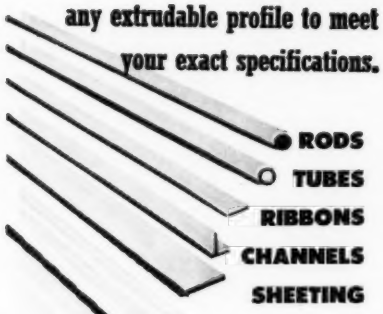
Challenge Clopay Plastics to do your job!

Clopay research has made revolutionary progress in the development of precision plastics with material characteristics of the widest versatility.

Clopay facilities and new compounding techniques offer new opportunities in the engineering of

POLYVINYL CHLORIDE
ACETATE
POLYSTYRENE
ACETATE-BUTYRATE
ACRYLICS
HIGH-IMPACT
HIGH STYRENE COPOLYMERS

Thermoplastics in any extrudable profile to meet your exact specifications.



RODS
TUBES
RIBBONS
CHANNELS
SHEETING

Round, flat or unusual shapes in a complete range of colors . . . low and high temperature properties . . . hard or soft with required degree of toughness and dielectric strength to meet the most exacting specifications . . . any combination to satisfy difficult requirements for gaskets, mouldings, tubing, electrical insulation and other uses. Clopay Vinyl extrusions are an authentic improvement over rubbers (natural or synthetic) not a substitute.

CHECK THESE CLOPAY SERVICES

☐ **1.** Fabrication of Vinyl film, supported and unsupported, and Polyethylene film for specialized uses.

☐ **2.** Vinyl coating and embossing of papers and textiles.

☐ **3.** Multi-color printing (surface and rotogravure) for decorative uses and military wrapping and packaging.

☐ **4.** Precision fabrication of extruded and molded parts.

☐ **5.** Precision slitting, electric-eye controlled cutting, die-cutting, electronic and thermal sealing, and high speed production line sewing of plastics.

☐ **6.** Manufacture of cast Vinyl film for applications where uniform high strength and dielectric properties are required.

☐ **7.** Complete Laboratory and Engineering facilities for research and development.

For specific information write, wire, or phone . . .

INDUSTRIAL PRODUCTS DIVISION

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Phone: DUnbar 4800

New York: 386 Fourth Avenue, Room 608
Murray Hill 3-8066

Capacity to mould up to 22½ *pound* pieces with WMP's revolutionary new vertical machine immediately opens entire new product fields and markets to you — and suggests such applications as injection moulded lighting fixtures, battery cases, television receiver cabinets, refrigerator linings, and similar products of a size never before thought of as injection moulded.

See this tremendous capacity machine in actual operation now at the WMP plant in Worcester. And by all means talk over your extremely large piece moulding plans and requirements with the WMP engineering staff. You'll find WMP cooperative, resourceful, experienced — above all ready to help you reach *new* markets with *new* products, as well as to improve your position in present ones. May we send our plane for your visit?

wmp

Custom Injection Moulding

WORCESTER MOULDED PLASTICS CO.

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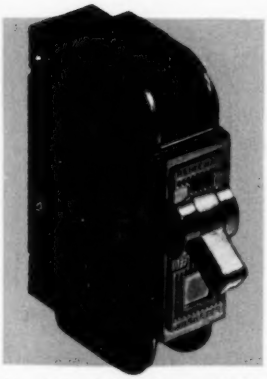
17 East 42nd St., New York 17, N. Y.



Electrical resistivity, fine smooth finish, and low cost are all combined in this household panel-board circuit breaker. It's readily and rapidly molded from **BAKELITE General-Purpose Phenolic BM-2498.**

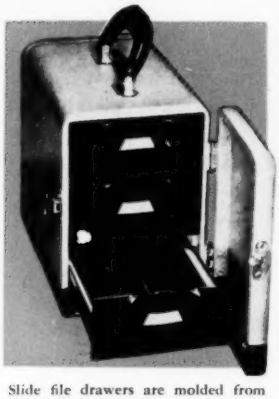
Made for Heinemann Electric Co., Trenton, N. J., by Kuhn & Jacob Molding & Tool Co., Trenton, N. J.

This plunger for commercial orange juice squeezer is molded from **BAKELITE General-Purpose Phenolic BM-93.** Strong, smooth, easily cleaned, it is also resistant to action of citric acid.

Made for Turbo Machine Co., Lansdale, Pa., by Plastic Fabricators Inc., Fernwood, Pennsylvania.

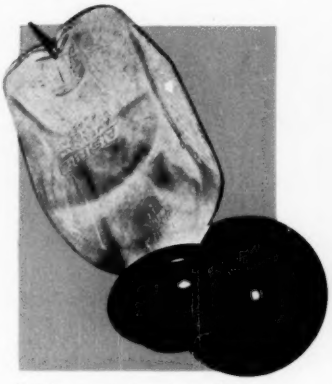
This loading port ring for automatic clothes dryer stays smooth—won't snag clothes. Made from **BAKELITE Improved-Impact Phenolic BM-6260,** it resists soap and detergents, heat, and impact in loading clothes.

Made for Hamilton Mfg. Co., Two Rivers, Wis., by Chicago Molded Products Corp., Chicago, Ill.



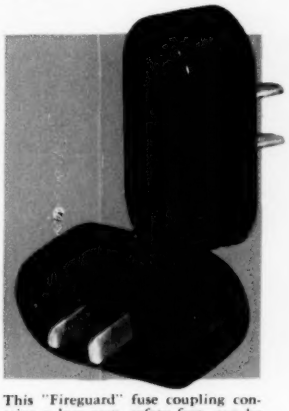
Slide file drawers are molded from **BAKELITE General-Purpose Phenolic BM-14660,** which offers these advantages: easy flow for deep-draw molding, rich brown mottled finish, and dimensional stability.

Molded for Barnett & Jaffe, Phila., Pa., by Anrob Mfg. Co., Phila., Pa.



Cap for automatic venting and vacuum sealing closure for surgical fluid containers is molded of **BAKELITE Heat-Resistant Phenolic BM-13335.** It withstands repeated sterilization in saturated steam at 250 deg. F., 15 psi. pressure for 30 minutes.

Made for American Sterilizer Co., Erie, Pa., by Perry Plastics Inc., Erie, Pa.



This "Fireguard" fuse coupling contains a low amp. safety fuse, can be plugged into standard wall outlets. Molded from **BAKELITE General-Purpose Phenolic BM-2438,** the case has high dielectric strength and handsome lustrous finish.

Molded for F. H. Smith Mfg. Co., Chicago, Ill., by Hauser Products, Chicago, Ill.

Good reasons all— for selecting Phenolic Plastics!

If you're looking for impact strength, ease of molding, chemical resistance, or a combination of such qualities—try BAKELITE Phenolic Plastics!

The wide variety of BAKELITE Phenolic Plastics makes your selection easy. You can pick the plastic that's *right* for the job. And the examples above show how many *different* jobs phenolic plastics are finding today.

Make sure that your product is made from the best, most useful, most suitable molding material. Look into BAKELITE Phenolic Plastics for better design, performance, saleability. Our engineers will help you. Write Dept. EB-13.

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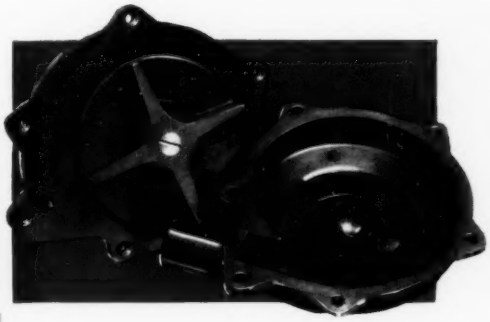
IDEAS IN PLASTICS FROM G.E.'s MOLDING SERVICE



A Plastics Pump? Yes...

It's Lighter, Quieter, Less Expensive

G.E.'s COMPLETE MOLDING SERVICE OFFERS YOU—

- Complete mold-making facilities
- Impartial material selection
- Injection presses from 3 to 208 ozs.
- Compression presses from 3 to 36 ins.
- Complete extrusion facilities
- Complete silicone rubber fabricating facilities
- Complete molded mycalex facilities

PLUS the benefit of 60 years' experience in designing, engineering and molding plastics parts.

Here's a brand-new idea in plastics from General Electric's complete molding service—a *plastics* pump! Pump parts in plastics offer many advantages: conservation of metal; light weight; relatively noiseless operation with little need for lubricants. Strong and resilient, they resist moisture and abrasion, function successfully even when high temperatures are present.

This model pump suggests new design possibilities in automatic washing machines and chemical equipment. It's just one more example of how G.E.'s *complete* molding service offers *ideas* in plastics which may help improve products or effect important economies. Ideas like this are what bring so many manufacturers to General Electric for plastics parts and services. They know that G.E.'s *complete* plastics service includes not only tremendous molding facilities but the ideas and creative "know-how" that can mean low-cost, high-quality plastics parts.

For full information about G.E.'s complete molding service, just write to General Electric Company, Section 110-4A, Chemical Division, Pittsfield, Massachusetts.

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